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SHOULD THE BARRIERS AGAINST TYPHOID BE CONTINUED?*

JAMES G. CUMMING, M.D., DR.P.H.
Chief, Bureau of Preventable Diseases
WASHINGTON, D. C.

Typhoid is now recognized as a carrier disease. Therefore the possibilities of distribution are enormously increased over those in diseases having no carrier state. They are increased because a healthy carrier has contact with those about him over a long period. This contact, under favorable conditions of transmission, inevitably means infection of susceptible persons.

The last typhoid outbreak in Washington (1922) was of carrier origin. Its salient points are as follows:

About 400 persons attended a church supper. In forty-four of these typhoid developed, and four died. In the resultant investigation by the department of health, all foods served at the supper, except one, were ruled out as sources of typhoid infection. This was the potato salad; this one food had been eaten by all those taken sick. The dressing used in this salad was eliminated from suspicion, because it had been boiled. It was evident, then, that the potatoes alone were the vehicle of typhoid transmission.

In the preparation of the salad, the boiled potatoes while still warm had been peeled and diced by four women. During this peeling and dicing process, hands, soiled with typhoid bacilli, had deposited their germs on the potatoes. The pans containing this food had been covered with towels and set aside until the next day, thus retaining the warmth and providing an excellent culture medium; consequently, contamination was multiplied many times.

Two of the four women who had peeled the potatoes proved on examination to be typhoid carriers. One of these had a history of typhoid fever twenty-two years previous. In the interim there had been six cases of typhoid in her immediate family; in the case of the other carrier, no history of the disease could be secured. It is interesting to note that an examination of specimens from both carriers in 1927, five years after the outbreak, showed that they still harbored typhoid bacilli.

In the department's laboratory, we were able to duplicate the transmission phase of this outbreak. Both carriers were prevailed on to boil, peel and dice a number of potatoes. These were then taken to the laboratory, where they were incubated for twenty-four hours, then examined for typhoid bacilli. The organism was isolated from only one of the two specimens. It is noteworthy that the carrier who prepared the specimen found to be negative had insisted on thoroughly washing her hands before the operation was undertaken.

As the next step in the investigation, we undertook to determine the influence of hand cleanliness on typhoid distribution. First, the hands were lightly contaminated with typhoid bacilli. Boiled potatoes were prepared and incubated. There were four such tests, and typhoid organisms were isolated in each experiment.

In the next series of tests, the hands were contaminated with typhoid, then thoroughly washed with soap and running water; the potatoes were then prepared as before. Four such tests were made, and all proved negative, indicating the importance of clean hands in breaking the chain of transmission.

Food-borne typhoid transmission takes place in a simple way. It is a four-link chain. The first link is the carrier or, to be more exact, the stool or urine excretion; the second link, the soiled hands; the third, the contaminated food; and the fourth, susceptible persons who consume food so contaminated. In the last experiment cited, the factor of hand cleanliness broke the second link, soiled hands, thus indicating that in this four link chain of transmission the hands of carriers can be rendered biologically clean.

The standard of personal hygiene depends on the sanitary conveniences of the home; these in turn are dependent on the sewerage system of the community.

Formerly, even in large cities, human excreta, the primary vehicle of distribution, were disposed of in the least troublesome and most economical way, perhaps into a pit or into a stream, both of which methods of disposal were conducive to fly and water distribution of the contagion.

The next step in the evolution of disposal was the sewage carriage system; at that period, no thought had been given to the dangers of stream pollution and the resultant typhoid distribution. As municipalities enlarged, they became dependent more and more for their water supplies on rivers, in many instances a supply highly polluted by the sewage of towns or cities up stream.

This connecting link between typhoid cases and carriers up stream, with susceptible persons down stream, through the sewerage system of one and the public water supply of the other, could produce but one result—a great prevalence of typhoid.

For the last twenty years, municipalities have protected their inhabitants by the filtration of the water supplies at a heavy expense. But that money was well invested, for now those early expenditures are paying dividends in the saving of almost 100,000 lives annually.

* Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.

No town today can afford to be without a safe water supply. All of which means that the sanitation of public water supplies has reached a high standard of efficiency by sedimentation, filtration and chemical treatment.

Another major factor in the control of typhoid transmission is the pasteurization of milk. As far back as 1892, Nathan Straus, interested in preventing infant mortality, established milk depots in New York City. It was, however, somewhat later that contaminated milk was recognized as the means of transmission of infectious diseases, including typhoid. In fact, it was not until twenty years after the establishment of the first depot that Mr. Straus could say that he had won his fight for safe milk.[1]

RELATIVE MENACE FROM THE SICK PATIENT AND FROM THE HEALTHY CARRIER

It will be noted that the preventive measures for typhoid are not set up spasmodically as emergency measures in time of epidemics, but that they are continuous in their operation and are applied to the mass of the population. Such continuous protection guards against distribution from the healthy carrier as well as from the sick patient.

The relative danger of typhoid distribution by patients and by carriers may be pointed out as follows: From 90 to 95 per cent of patients are free from infection at the end of four weeks. The remaining 5 to 10 per cent are carriers, and these continue to distribute their infection for a longer or a shorter period. In many of these a permanent carrier state develops, and their menace to the public is cut short only by the grim reaper or by their recognition by health authorities.

Since the average age for typhoid infection is 22 years and the expectation of life at that age is 62, it may be assumed that the permanent carrier is a source of infection distribution for about forty years.[2] Contrast the four weeks' distribution of typhoid bacilli by the sick patient with the possible forty years' distribution by the healthy carrier! On the basis of the ratio of cases to carriers and their respective periods of dissemination, it appears that carriers are responsible for approximately 96 per cent of typhoid distribution. The difficulty in the eradication of typhoid is not the sick bed patient but rather the healthy carrier who goes blithely on his way distributing his infection. Would not this menace of the carrier, then, explain the failure to control typhoid in the early days through quarantine of patients and the disinfection of their excreta? The latter are emergency measures only; on the other hand, water purification and milk pasteurization block wholesale dissemination of disease from carriers, and thus have lowered the typhoid rate.

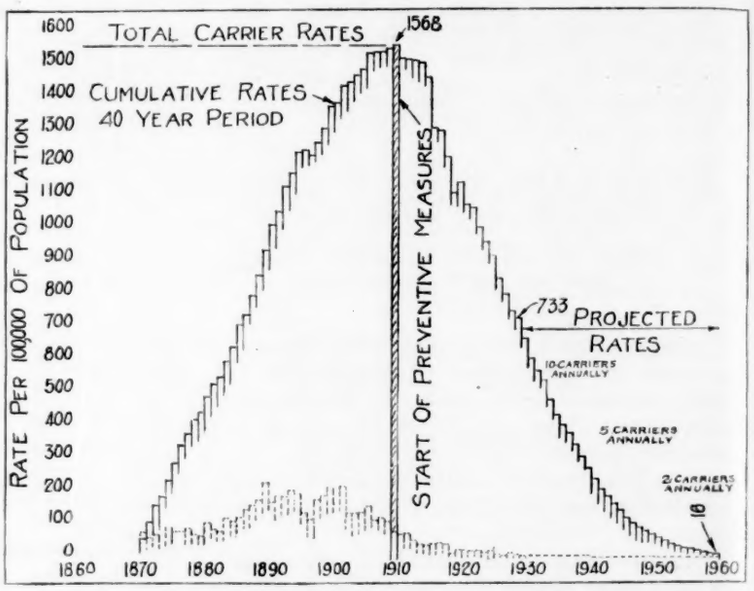

Chart 2.—Typhoid carrier rates in Washington, D. C. Note that in the prepreventive period there had been a cumulative increase in the typhoid rates. This reached its maximum with concentration of population and the resultant increase in distribution of infection. The carrier rate is influenced throughout the decades only by the prevalence of the disease. With the blocking of distribution about two decades ago, there was an immediate reduction in cases and an automatic cumulative decrease in the successive annual carrier rates. It would appear that the rate will reach its vanishing point about three decades hence. Thus, eradication requires half a century.

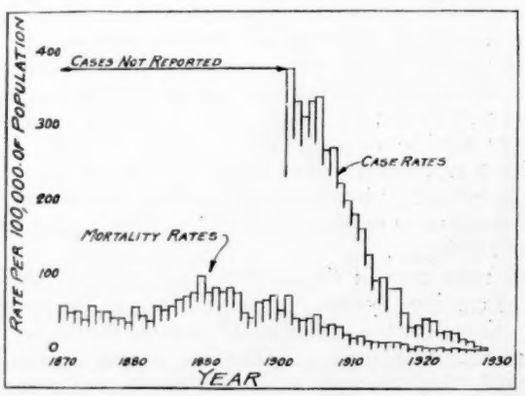

Chart 1.—Typhoid in Washington, D. C. (1870-1930).

ESTIMATION OF HEALTHY CARRIER RATE

It should be evident, then, that the eradication of typhoid is possible only through continued protection against the carrier. Let us determine how many carriers there are in the District of Columbia, and for how long they may remain a menace.

The essential factors required for determining the carrier rate for any year are:

1. The average age of attack for typhoid.
2. The expectation of life at the age of attack.
3. The yearly mortality from typhoid.
4. The population.

The average age of attack is 22 years, and the expectation of life for that age is forty years. Since the annual mortality rate happens to be approximately the same as the annual production of carriers, the cumulative carrier rate per hundred thousand of population may be calculated on the basis of population for the particular year in question and the number of carriers produced during the preceding forty years. On the basis of the foregoing factors, there was in Washington in 1910 the peak carrier rate of 1,568 per hundred thousand of population, while in 1930 this rate had been reduced to 671. That the eradication of typhoid is a long drawn out process is indicated by the fact that in 1960 the rate will be 16 carriers per hundred thousand of population.

1. Straus, Lina G.: Disease in Milk; the Remedy Pasteurization, ed. 2, New York, E. P. Dutton & Co., Inc., 1917.
2. United States Abridged Life Tables, 1919-1920, Bureau of Census, Washington, D. C., 1924.

CONCLUSIONS

It may be said that our control of typhoid is the result of blocking the major avenues of infection distribution. This continuous blocking process through the purification of milk and water has successively reduced the number of new cases in each human cycle of typhoid fever. Thus there has been an automatic reduction in the number of healthy carriers, both because those produced before sanitary control measures were perfected are gradually dying off and because each newly produced group consists of a progressively diminishing number. All of which means that there is a cumulative decrease in both cases and carriers with each succeeding year.

Our present-day typhoid is perhaps all, or nearly all, of carrier origin, through food contamination. This and other minor routes of distribution are, however, of but limited importance in control leading to eradication, because the major avenues, water and milk supplies, are effectively blocked.

The reduction of typhoid mortality by 98 per cent does not mean that the barriers against distribution may be lowered, for this reduction is no criterion of the potential dangers of infection distribution. Healthy carriers are still one half as prevalent as in 1910. To reach "the vanishing point" of the typhoid carrier will require at least another quarter of a century.

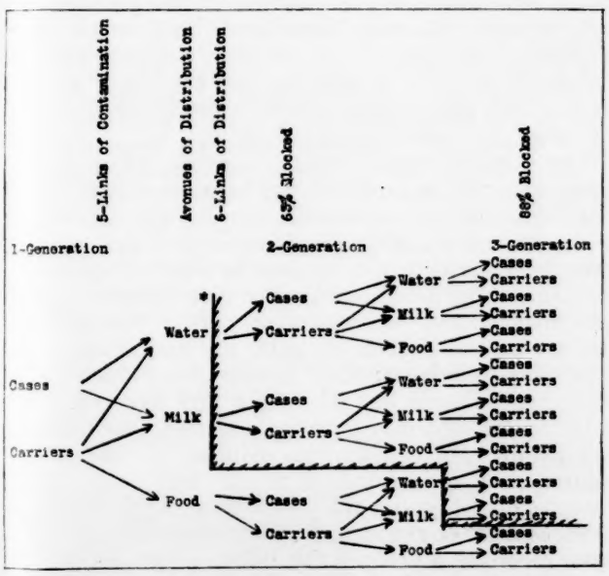

Chart 3.—Three generations of typhoid transmission.

* Purification of water and pasteurization of milk blocks transmission through those avenues of distribution. All cases and carriers above and to the right of the shaded line are eliminated by the blocking process. Note that there is a cumulative control in the successive generations of distribution.

In the meantime, the barriers against transmission cannot be lowered; the purification of public water supplies must be maintained; the pasteurization of milk must be enforced, and, in addition, higher standards of personal hygiene must become the everyday practice of the everyday man.

Noise.—There is a greater money loss involved in noise than is generally realized. When a machine operates noisily, you know at once that it is either badly worn or poorly built, and in either case is inefficient and wasteful of effort. Human energy, whether applied through brain or hands, also works most efficiently when free from distraction and noise.—Slocum, S. E.: Noise and Vibration Engineering, New York, D. Van Nostrand Company, Inc., 1931.

ROENTGENOLOGIC AND PATHOLOGIC ASPECTS OF GASTRIC POLYPOSIS *

B. R. KIRKLIN, M.D.
AND
ALBERT C. BRODERS, M.D.
ROCHESTER, MINN.

Although the term "gastric polyposis" is unfortunate in its indiscriminate application, it is nevertheless difficult to abandon without losing trace of valid case reports. The term has been applied to a variety of types of endogastric neoplasm and hyperplasia, whether single or multiple, benign or malignant. For this there is some justification in the fact that any pedunculated new growth or hyperplasia, whatever its histologic character, arising from a mucous surface is a polyp; polyps of any kind may be single, and polyps of similar structure, even though single, seem entitled to inclusion in the same group.

Conspicuous in the literature concerning benign polypoid new growths of the stomach, and almost invariably referred to in later discussions of this subject, is the thorough paper by Menetrier [1] published more than forty years ago. Menetrier confined his exposition to simple, primarily benign, mucous polyps in which all the mucosal elements are hypertrophied, including the glands. Stressing the adenomatous feature, Menetrier described two varieties, "polyadenomes polypeux" and "polyadenomes en nappe." In the first group were classified the discrete polyps with independent attachments, either pedunculated or sessile. These growths vary in size up to about 2 cm. in diameter; they are soft, and gray, ashy, brown or red. They vary in number from 1 to 300 or more and may be situated in any part of the stomach, although they seem to be somewhat more common in the pyloric portion. Microscopically they consist largely of glandular tissue, the glands being lengthened, often tortuous, sometimes compound, and devoid of pepsin cells. In the second group were classified the polyps that arise from a common, thickened plaque-like base; they are closely packed in orderly rows and macroscopically resemble the convolutions of the brain, a descriptive phrase which Menetrier credited to Briquet. The glands are elongated vertically; their length is increased five or six times, and their breadth is increased much less or even diminished. Despite their differences, Menetrier regarded the two varieties as belonging to the same pathologic genus, and in proof cited a case in which the two forms coexisted.

To Menetrier's exhaustive description, little can be added. In view, however, of the marked difference in the gross appearance of the two varieties as well as the histologic differences in the glands and the great rarity of the second variety, we incline to the opinion that he might better have given the latter an independent pathologic status. One of us (Broders) has previously suggested that it might be designated as "polypoidosis."

Under the heading gastric polyposis, or an allied title, many case reports have appeared. Covering the period from 1833 to 1922, Mills [2] reviewed twenty

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* From the Section on Roentgenology and the Section on Surgical Pathology, the Mayo Clinic.

* Read before the Section on Radiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

1. Menetrier, P.: Des polyadenomes gastriques et leurs rapports avec le cancer de l'estomac, Arch. de physiol. norm. et path. **1**: 32, 236, 1888.
2. Mills, G. P.: Multiple Polypi of the Stomach (Gastritis Polyposa), with the Report of a Case, Brit. J. Surg. **10**: 226-231 (Oct.) 1922.

cases, including one of his own. Rosenbach and Disqué,[3] using the term "adenomatosis," reviewed 122 cases reported from 1824 to 1923. In certain of the reports the adjectives adenomatous and papillomatous are used in such a manner that the exact morbid anatomy is not clear. Two cases of malignant papillomas are reported under the title of gastric polyposis. Of all cases noted, a large majority evidently fall within Menetrier's first group; in most of these the polyps were single; in a minority they were multiple but discrete. Only a small number seem to be typical examples of Menetrier's second group; certain of the cases reported by Myer,[4] Heinz,[5] Mills, Douglas,[6] Brams,[7] Ruggles,[8] Bryan,[9] Sielmann and Schindler,[10] McPhedran,[11] Gâldau and Pop,[12] Cameron and Wright-Smith,[13] Strauss, Meyer and Bloom,[14] and Rigler[15] probably belong in this group.

With respect to etiology, Menetrier considered the types of adenomatous hyperplasia to be of inflammatory origin, for in all cases he found either gross or microscopic evidence of associated chronic gastritis. Eliason, Pendergrass and Wright[16] recorded three cases in which an area of hypertrophied rugae had prolapsed into the pylorus, and in one case a few mucous polyps were seated on the rugae, thus supporting the opinion of these authors that polyps ensue from the drag of the food current on hypertrophied rugae. Kaufmann[17] and Ribbert[18] distinguished between inflammatory mucous polyps and the more definitely adenomatous species, and regarded the latter as congenital lesions. Heinz noted a familial tendency. According to Myer, sex apparently does not play a part, but Bryan found polyposis among men and women in the proportion of 3 to 2. Although occasionally polyps have been discovered in relatively young persons, almost all the patients were in the cancer decades.

Gastric polyps are sometimes incident to general polyposis of the gastro-intestinal tract. In the fifty cases of intestinal polyposis reviewed by Doering,[19] polyps also were found in the stomach in five or six. Collier's[20] case was notable in that the growths were found in the stomach, large intestine and small intestine, the greatest number being situated in the small bowel. In Sielmann and Schindler's case, the barium meal was traced through the colon, and many transradiant areas characteristic of polyps were seen.

Although polyps are at least primarily benign, they hold their benignant status somewhat precariously. In certain cases they have been found associated with gastric carcinoma and in other cases parts of the same tumor were benign and other parts were malignant, indicating carcinomatous change. Menetrier showed rather conclusively that adenomatous polyps may become malignant. Opinions as to the frequency with which this occurs are divergent, partly perhaps because of varying conceptions of polyps. Papillomas are prone to become malignant. Of the twenty cases reviewed by Mills, four were associated with carcinoma, but despite this coincidence he believed that malignant change in polyps is not common. Bryan estimated that it occurs in 60 per cent of the cases. Heinz stated that carcinoma is present in about half the cases of polyposis of the intestinal tract, and the combination may be manifold; for example, there may be carcinoma of the intestine with benign polyps of the stomach, or vice versa, or a combination of carcinoma and polyposis in both organs. Doering, Struthers[21] and others have emphasized the tendency of intestinal polyps to become malignant, and if it is assumed that they have a close kinship with gastric polyposis the ultimate innocence of the latter is at least open to doubt.

The fact that many cases of gastric polyposis are discovered only at necropsy has been cited as evidence that the disease may exist without symptoms. However, if the lesions are widespread, or if they are situated near the pylorus and cause obstruction, the symptoms are likely to be pronounced. The directly relevant history may extend over years or only a few months. Besides gastric distress or pain, the major signs and symptoms include anorexia, hematemesis, blood in the stools, anemia and loss of weight and strength. The latter trio is especially common and may constitute the sole manifestations apparent. Absence of free hydrochloric acid and abundant mucus are often salient features of the gastric analysis. Infrequently there is a palpable mass or resistance in the epigastrium. In three cases recorded, a preoperative diagnosis was established by the recovery of a polyp from the gastric contents, and in one of these cases[4] a polyp was also found in the stool. Without such histologic evidence, the symptoms and signs are rather suggestive of carcinoma or ulcer. With the growing use of the roentgen ray, the diagnosis has been greatly facilitated.

REPORT OF CASES

From the records of the Mayo Clinic we have selected nineteen cases which may be cited as examples of gastric polyposis in its broad signification. In all cases roentgenoscopic examination was made and the diagnosis proved by operation. Fifteen of the patients were men, and four were women; their average age was 50 years; the youngest patient was aged 20 years. In four cases the adenomas were single; in one case the tumor was lobulated but had a single pedicle; in five cases there were only two or three polyps; in eight cases the growths were numerous. Evidence of chronic gastritis was noted by the pathologist in many of the cases. In two cases superficial ulceration was observed; in none

3. Rosenbach and Disqué, Jr.: Die Adenomatose des Magens und ihre Beziehung zum Carcinom, Arch. f. klin. Chir. **124**: 28-48, 1923.
4. Myer, J. S.: Polyposis Gastrica (Polyadenoma), J. A. M. A. **61**: 1960-1965 (Nov. 29) 1913.
5. Heinz, H.: Ueber Polyposis ventriculi, Beitr. z. klin. Chir. **93**: 228-250, 1914.
6. Douglas, John: Benign Tumors of the Stomach, Ann. Surg. **77**: 580-586 (May) 1923.
7. Brams, W. A.: Plaque-Like Adenoma of the Stomach: Its Differential Diagnosis and Treatment, M. Clin. North America **8**: 533-538 (Sept.) 1924.
8. Ruggles, H. E.: Unusual Gastric Polyp, Am. J. Roentgenol. **7**: 356-357 (July) 1920.
9. Bryan, L.: Gastric Polyposis, Southwestern Med. **6**: 223-227 (June) 1922.
10. Sielmann, Richard; and Schindler, Rudolf: Beitrag zur Röntgendiagnose und Klinik der Polyposis ventriculi diffusa, Fortschr. a. d. Geb. d. Röntgenstrahlen **33**: 191-195, 1925.
11. McPhedran, Alexander: Multiple Polypi in the Stomach (Gastric Polyposis), Canad. M. A. J. **11**: 524-525 (Aug.) 1921.
12. Gâldau, D., and Pop, A.: Ueber gutartige Magentumoren: ein neuer Fall von Polyposis ventriculi, Fortschr. a. d. Geb. d. Röntgenstrahlen **35**: 270-272 (Nov.) 1926.
13. Cameron, C. R., and Wright-Smith, R. J.: Diffuse Gastric Polyposis Accompanying Carcinoma of the Pancreas, M. J. Australia **2**: 258-260 (Aug. 20) 1927.
14. Strauss, A. A.; Meyer, Jacob, and Bloom, Arthur: Gastric Polyposis: A Report of Two Cases, with a Review of the Literature, Am. J. M. Sc. **176**: 681-690 (Nov.) 1928.
15. Rigler, L. G.: Roentgenologic Observations on Benign Tumors of the Stomach, with a Report of Fifteen Cases, Am. J. Surg. **8**: 144-150 (Jan.) 1930.
16. Eliason, E. L.; Pendergrass, E. P., and Wright, V. W. M.: The Roentgen-Ray Diagnosis of Pedunculated Growths and Gastric Mucosa Prolapsing Through the Pylorus: Review of the Literature, Am. J. Roentgenol. **15**: 295-322 (April) 1926.
17. Kaufmann, Eduard: Lehrbuch der speziellen pathologischen Anatomie, Berlin, W. de Gruyter & Co. **1**: 541, 1922.
18. Ribbert, Hugo: Lehrbuch der allgemeinen Pathologie und der pathologischen Anatomie, Leipzig, F. C. W. Vogel, 1920, p. 281.
19. Doering, H.: Die Polyposis intestine und ihre Beziehung zur carcinomatösen Degeneration, Arch. f. klin. Chir. **83**: 194-227, 1907.
20. Collier, William: Multiple Polypi of Stomach and Intestine, Tr. Path. Soc. London. **47**: 46, 1896.
21. Struthers, J. E.: Multiple Polyposis of the Gastro-Intestinal Tract, Surg., Gynec. & Obst. **38**: 610-623 (May) 1924.

of the cases were the polyps associated with gastric carcinoma and in only one case with intestinal polyposis.

In the eleven cases in which one polyp or two polyps were present, the features were not extraordinary (fig. 1). In all except one case, the polyps, which were small and situated in the antral segment of the stomach, produced the rounded central defects characteristic of benign polypoid tumors, as the roentgenologist reported. In the excepted case he attributed the prepyloric defect to early carcinoma.

More striking from every standpoint were the eight cases of numerously multiple polyps. The principal features were as follows:

CASE 1 (previously reported by Balfour [22]).—A man, aged 31, for eight years had experienced gastric distress, which was controlled by eating frequently but had become worse during the last three years. There was no history of vomiting or bleeding. Hydrochloric acid was not found in the test meal. Balfour stated: "The only clue which led to a preoperative diagnosis was secured by examination with the roentgen ray. The entire pyloric end of the stomach was diffusely mottled, apparently well demarcated both at the pylorus and at a line about 10 cm. above the pylorus. Carman, after reexamination to exclude the possibility of complicating factors, such as the patient having taken food before the first examination, made a diagnosis of gastric polyposis, and on this diagnosis the patient was sent to the hospital for exploration." At operation the stomach appeared normal, but on palpation the wall of the pyloric segment was felt to be soft, doughy and thick. Two fifths of the stomach was resected. The gastric mucosa was highly congested; the rugae were hypertrophied and their summits were closely studded with globular tumors. These were arranged in rows in the transverse axis of the stomach, were soft and velvety to the touch and were mostly about 2 cm. in diameter, although some were smaller. On microscopic examination the tumors were found to be made up of greatly hypertrophied mucosa, including benign hyperplasia of the glands. The pathologist's diagnosis was polyposis (figs. 2 and 3).

CASE 2.—A man, aged 46, for two years had had intermittent attacks of distress after taking food. Loss of weight was slight; the hemoglobin was 88 per cent; the total gastric acidity was 24, with absence of free hydrochloric acid. The roentgenologic diagnosis was gastric polyposis. At operation an area of gastric mucosa, 7 by 12 cm., which was greatly hypertrophied and so loose that "it could be moved about like a bunch of worms," was excised. The pathologist's diagnosis was inflammatory mucous membrane with mild polyposis.

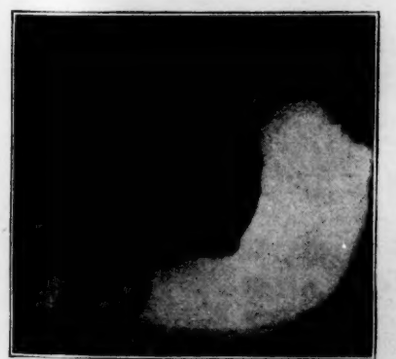

Fig. 1.—Central defect in antrum of stomach, representing a single adenomatous polyp.

CASE 3.—A man, aged 50, gave an indefinite history of loose stools and weakness. Endamoeba histolytica and erythrocytes were found in the stools. The hemoglobin varied from 54 to 85 per cent (Dare) during observation for four months. The total gastric acidity was 20, all combined, and mucus was marked. Roentgenologic examination disclosed an obstructive lesion at the pylorus. At operation the pyloric segment was resected. The pathologist's diagnosis was early polyposis associated with localized gastritis.

CASE 4.—A woman, aged 50, for six years had had intermittent attacks of gastric distress two or three hours after meals, which were relieved by food. She had lost 10 pounds (4.5 Kg.) in weight. The hemoglobin was 72 per cent (Dare). The total gastric acidity was 10; free hydrochloric acid was absent. The roentgenologic diagnosis was gastric polyposis. On surgical exploration, small soft nodules could be felt from the pylorus, where they were most numerous, almost to the esophagus. Evidence of metastasis was not seen. The surgical diagnosis was gastric polyposis.

CASE 5.—A man, aged 56, for the last ten months had noted the gradual onset of fatigue, dyspnea and pallor, together with

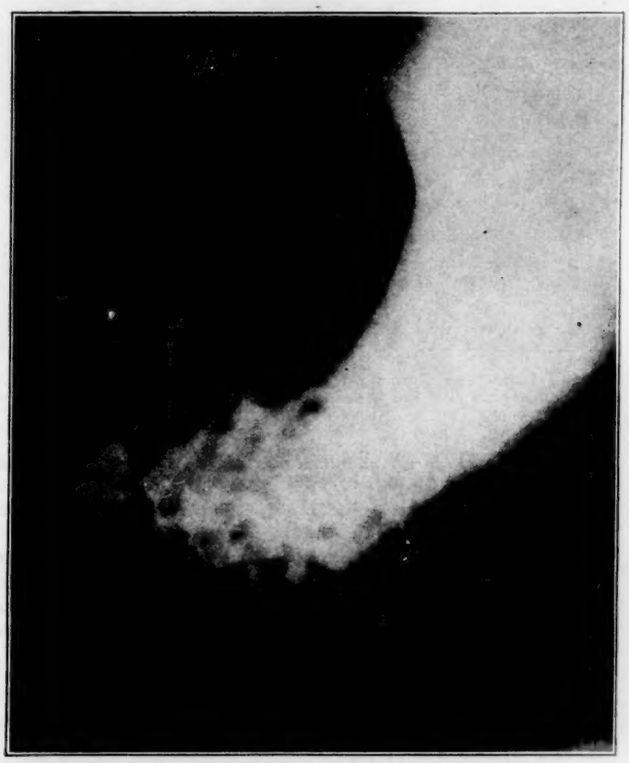

Fig. 2 (case 1).—Closely aggregated, rounded, marginal and central defects in the distal half of the stomach. Polyadenomes en nappe.

epigastric distress which was relieved by taking food. The hemoglobin was 8.8 Gm. in each 100 cc. (photo-electric method). The gastric analysis showed total acidity of 20 and no free hydrochloric acid; mucus was in excess. Roentgenologic examination disclosed multiple shadow defects, which were most marked in the middle third of the stomach near the lesser curvature. At operation the stomach was opened and multiple soft polyps were found over the entire posterior wall from the cardiac end to within 8 or 10 cm. of the pylorus. The pathologic diagnosis was polyposis.

CASE 6.—A man, aged 66, for several months had had attacks of epigastric pain or distress, which was aggravated when he took food. He had not lost weight, and the hemoglobin was 76 per cent (Dare). On roentgenologic examination, multiple rounded defects were seen in the distal half of the stomach. At operation, multiple polyps, varying in size from 1 to 3 cm. in diameter, were found in the lower half of the stomach. One polyp was situated near the pylorus and had prolapsed into the duodenum. About half of the stomach was removed. The pathologist reported multiple pedunculated and sessile adenomatous polyps.

CASE 7.—A man, aged 34, had had gastro-enterostomy performed for a peptic ulcer ten years previously. For five years he had had symptoms indicative of a gastrojejunal ulcer, and this condition was confirmed by the roentgenologic examination. At operation a healed duodenal ulcer and a gastrojejunal ulcer were found. The gastro-enterostomy was disconnected, the gastrojejunal ulcer was excised and the continuity of the jejunum was restored by end-to-end anastomosis. The surgeon noted the following: "As far as the finger could palpate, the

22. Balfour, D. C.: Polyposis of the Stomach, Surg., Gynec. & Obst. 28: 465-469 (May) 1919.

mucosa of the stomach showed typical gastric polyposis; the many individual polyps, which were about 2 cm. in diameter, were arranged in rows, as described by French writers."

CASE 8.—A woman, aged 20, was operated on in 1918 for a large duodenal ulcer. At that time the surgeon found the mucosa of the stomach to be studded with small polyps, and when he performed the gastro-enterostomy similar polyps were discovered in the jejunum at the site of anastomosis and

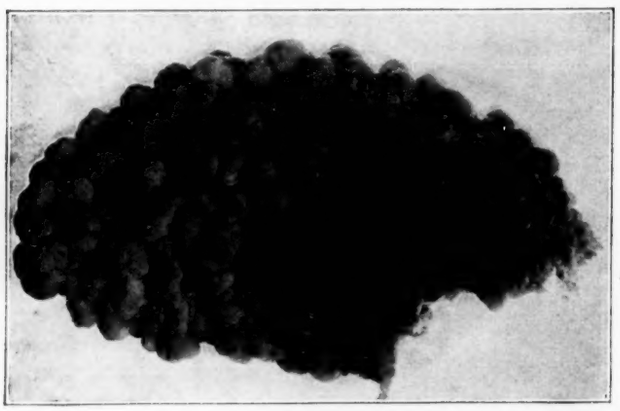

Fig. 3 (case 1).—Internal surface of stomach. The polyps are small, fairly uniform in size and arranged in rows resembling the convolutions of the brain.

beyond it. In 1929 an adenomatous polyp was removed from the cecum, and other polyps were found in the left half of the colon; a few days previous to this operation, four polyps in the rectum had been fulgurated. A year later the left half of the colon was resected after a prior anastomosis of the middle of the transverse colon to the sigmoid. The pathologist reported that the resected portion of the bowel contained three pedunculated adenomatous polyps, the largest of which was 6 cm. in diameter (fig. 4).

Cases 1, 2 and 7 were typical of Menetrier's "polyadenomes en nappe"; the remaining cases may be classed with his first variety.

COMMENT

These cases, together with those recorded by other observers, indicate that the roentgenologic manifestations of polyposis are fairly distinctive. A characteristic of benign intragastric tumors is that they produce smoothly rounded defects within the gastric shadow, and this evidence of polyps, however small and few in number, can almost invariably be elicited by careful roentgenoscopic inspection with appropriate manipulation. If the polyposis is extensive, multiple small indentations along one or both curvatures, together with rounded or oval transradiant areas within the barium shadow, constitute a picture which is virtually pathognomonic. The appearance of the stomach might be likened to that of a bag partially or completely filled with beans. Failure to discover roentgenologic signs of polyposis in some of the cases reported suggests that the technic of examination was not adequate. It is now generally known that complete filling of the stomach with the barium suspension may conceal lesions which would be evident with a smaller amount of the opaque medium, or which could be made manifest by palpatory compression during roentgenoscopy. With the present standard procedure of inspecting the stomach as it fills, and approximating its walls by manual pressure in order to exhibit its internal relief, polypoid excrescences, even though minute, can scarcely escape observation. Preservation of the general gastric contour is sometimes an additional feature which aids in the diagnosis. If the polyps are not too closely set and the barium meal is thin, the mixture will have access to the wall and depict its outline, although often somewhat faintly. But if the polyps are tightly packed, or if the barium meal is very thick, the mixture cannot penetrate to the wall, and the latter will appear broken and irregular.

Pyloric obstruction seems to occur in only a minority of cases. When the prepyloric segment of the stomach is grossly involved, the polyps may intrude into the pylorus and obstruct it. A polyp which has prolapsed into the duodenal bulb is depicted as an ovoid central defect in the bulbar shadow. Gastric peristalsis is maintained in many cases of polyposis, even when the polyps are widespread. It indicates that the gastric musculature is not affected as in most organic diseases, and thus may serve to warn the examiner that the lesion is of an unusual character.

Other lesions and conditions which may require consideration in the differential diagnosis include masses of food in the stomach, simple hypertrophy of the rugae, gas in the colon, crenulation of the greater curvature, hair ball and polypoid carcinoma. Of all these conditions, perhaps the most imitative of polyposis are food masses in the stomach, which produce mottling of the barium shadow when the gastric walls are approximated by manual pressure. If there is doubt whether the patient has taken food shortly before the examination, the inspection should be repeated after the patient has

Fig. 4 (case 8).—The stomach prior to second operation. The transradiant areas represent multiple discrete polyps, polyadenomes polypeux.

fasted, and in cases of pyloric stenosis the stomach should be evacuated with the tube.

Simple hypertrophy of the gastric rugae is not rare, and the emphasis of the rugal markings varies in proportion to the degree of hypertrophy. It differs roentgenologically from polyposis, however, in that the defects typical of polyps are lacking.

Gas in the transverse colon is a common cause of irregularity along the greater curvature of the stomach.

The gas-distended portion of the colon is conspicuous, and the examiner should not fail to realize that it is the cause of the gastric deformity.

Crenulation of the greater curvature (the zahnelung of the Germans) has been given more serious attention abroad than here. It is characterized by a relatively fine serration of the greater curvature and is probably a spastic phenomenon. Conceivably it might be mistaken for polyps on the curvature.

Superfically the shadow of a hair ball has some resemblance to that of polyposis, but the gastric profile is completely preserved, the shadow defect is reticulated, and the oval defects of polyposis are wanting.

Carcinoma of the stomach is almost always a single mass. Rarely there are two separate growths, but numerous carcinomatous growths are practically unknown. Hence the filling defect is usually a single unit. As a rule, because carcinoma tends to ulcerate deeply, the internal border of the defect is shapelessly irregular. Exceptionally, carcinoma does not ulcerate and may have a polypoid form; in this event the picture is indistinguishable from that of a compound, lobulated benign polyp, but the latter is seldom encountered.

On the whole, the roentgenologic appearance of extensive polyposis is so distinctive that the diagnosis can be made with confidence. Even when the lesions are few, their polypoid character and probably their benignity should be apparent.

ABSTRACT OF DISCUSSION

DR. HENRY K. PANCOAST, Philadelphia: There are two characteristic features in gastric polyposis that all roentgenologists should understand. One is the tendency to bleed and therefore to produce anemia; the other is the tendency of the polypi to undergo malignant degeneration. I have seen an instance in which the stomach has been opened and carcinomatous patches have been found near by in addition to changes in the polypi. My custom, as in the Mayo Clinic, is to examine the stomach in every case of pernicious anemia. I have found this a good rule to follow, because in many cases of pernicious anemia, or with symptoms of pernicious anemia, the stomachs have shown evidences of gastric polypi. They have more tendency to bleed when they are in the vicinity of the pylorus, probably because they are subjected to more trauma here from the vigorous nature of the peristaltic waves as the pylorus is approached. I should like to ask the authors whether, in the cases of supposed pernicious anemia in which operations have been performed, they have found that the evidences of that condition have disappeared after operation. Do the diffuse polypi found throughout the stomach bleed to any great extent? If they all did, the more polypi the individual had the more bleeding would occur. I have not found this to be the case.

DR. LEON T. LE WALD, New York: Do the benign polypi of polypoid carcinoma degenerate into malignant tumors? Can the authors tell whether that is usually the case or whether the carcinoma grows in this peculiar polypoid way? I had one case of that sort in which the base of the growth and the entire polypoid condition was distinctly carcinomatous, and probably was so from the beginning. Also, I should like to ask whether in the differential diagnosis one could get a clue from the location of the polypoid lesion as to its benign nature, if it was farther away from the pylorus than in a malignant case which might be nearer the pylorus. In one of my cases the lesion, which was malignant, was high up on the greater curvature. I should be interested to know what operations were performed in these cases. What was done in the case in which there were two large masses and one small mass, which was previously diagnosed as inoperable carcinoma? Was there an extensive resection? In a case which is distinctly benign, if there is a tendency to later malignant degeneration, is it advisable to do an extensive primary operation?

DR. B. R. KIRKLIN, Rochester, Minn.: Dr. Pancoast emphasized the most important point in this connection: that most of these patients come for examination because of anemia and frequently receive diagnoses of pernicious anemia. The patient with a single polypus, whose roentgenograms I presented, was so anemic that it was necessary to keep him under observation for two months and give him transfusions before operation was feasible. I am sure that the anemia diminishes after removal of the polypi except in cases of true preexisting pernicious anemia. It has been our experience that the diffuse polypi do not bleed as freely as those which are single or few in number. Therefore, it is in those cases presenting one, two or three polypi that pronounced symptoms of anemia occur. We have not felt that numerously multiple polypi have a tendency to become malignant. However, the large single polypi frequently undergo malignant change. In the numerously multiple type of polyposis the stomach is resected. In the case that Dr. Le Wald mentioned, the one with three large polypi, the polypi were excised; whenever possible the conservative type of operation is done.

ANGINAL PAIN AS A RESULT OF DIGITALIS ADMINISTRATION *

G. K. FENN, M.D.
AND
N. C. GILBERT, M.D.
CHICAGO

Anginal pain as a result of the administration of digitalis has received relatively little attention in the literature. Occasional reference is made to the likelihood of this phenomenon, but more often the possibility is totally disregarded. In some instances it is stated that digitalis is capable of benefiting such pain. Fothergill,[1] in his Hastings Prize Essay of the British Medical Society in 1870, argues that digitalis will improve the coronary flow. His conclusions are based on theoretical considerations and he cites but two cases in which angina pectoris improved while under digitalis therapy. Lauder Brunton's [2] essay on digitalis at about the same time, does not touch on this question at all. Eggleston [3] is convinced that any idea of coronary constriction in man is "misleading and erroneous" and cites the animal experiments of Meyer [4] and of Sakai and Saneyoshi,[5] the lack of satisfactory evidence in man, and a bit of inductive reasoning to support his view. Robinson [6] does not think that reduction of the coronary flow from this cause has ever been demonstrated in man. He mentions heart failure with substernal pain that shows marked improvement on digitalis therapy. Cushny [7] states that coronary constriction in man has never been shown with therapeutic doses. Danielopolou [8] believes that digitalis is of value in the treatment of angina, particularly in the hypertensive cases, and says that in no case has he noted an exaggeration of the attacks. In his treatment as published, however, he combines digitalis with a considerable dose of nitrite, and the dose of digitalis is so small that it would have little or no effect.

* From the Department of Medicine, Northwestern University Medical School, and the Medical Service of St. Luke's Hospital.

* Read before the Section on Pharmacology and Therapeutics at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.

1. Fothergill, J. M.: Brit. M. J. **2**: 5, 1871.
2. Brunton, Lauder: On Digitalis, Edinburgh, 1866.
3. Eggleston, Cary: Am. J. M. Sc. **160**: 625 (Nov.) 1920.
4. Meyer, F.: Arch. f. Anat. u. Physiol., 1912, p. 223.
5. Sakai and Saneyoshi: Arch. f. exper. Path. u. Pharmakol. **78**: 331, 1915.
6. Robinson, G. C.: The Therapeutic Use of Digitalis, Baltimore, Williams & Wilkins Company, 1923.
7. Cushny, A. R.: Digitalis and Its Allies, London, 1915.
8. Danielopolou, D.: L'angine de poitrine et l'angine abdominale, Paris.

In most textbook treatises on angina, no reference is made to these questions, or perhaps a simple statement to the effect that digitalis has no place in the treatment of this condition may be found.

In von Neusser's [9] work, however, one finds the statement, "only in the employment of digitalis, the sovereign remedy in the treatment of heart affections, the utmost caution should be employed as it contains substances which have a vasoconstrictor effect." Poynton [10] believes that digitalis is hazardous in angina, particularly in those patients with fatty hearts. Mackenzie [11] finds that, among other things, oppression of the chest is a sign of digitalis overdosage. He clearly states, however, that this does not occur unless the therapeutic limits are transgressed. Sailer [12] reports two cases of coronary thrombosis in which the prognosis appeared to be reasonably good but in which death followed shortly after the initiation of digitalis therapy. Levine [13] avoids the use of digitalis in coronary thrombosis and states that his most successful cases have been those in which no digitalis was used. He attributes the bad results to the further irritation of an already irritable ventricular muscle. Bell and Pardee [14] comment on the inadvisability of digitalis therapy in coronary thrombosis. Lastly, reports may be found in which the authors state that they have seen distinctly bad results in angina pectoris, presumably from the use of digitalis. Allbutt [15] believes that, in angina, digitalis should never be used without atropine. He has tried it in a few cases of angina with failing heart and it seemed to do more harm than good. Verdon,[16] in a letter to the editor of the *Lancet*, says that the use of digitalis is a perilous procedure. He has observed several cases in which digitalis was used and, in all, the severity of the attacks increased. In two cases he believed that death should be attributed to the use of digitalis. Brooks [17] believes that digitalis commonly increases the frequency and severity of the complex. Mathieu [18] reports one case in which he directly attributes angina pectoris to the use of ouabain. This attack occurred in a patient who had never before had angina. His report leaves much to be desired, as he speaks only of the first attack and says nothing about the subsequent behavior of the patient.

Our own interest was drawn to this matter by the behavior of a patient who came under our observation about twelve years ago. While this patient was on digitalis treatment, attacks of angina pectoris suddenly developed. When the digitalis was withdrawn, the attacks ceased and the procedure was repeated several times with always the same result. The patient had a previous history of angina pectoris, and we at this time followed the belief of several authors in assuming that anginal attacks often stop as decompensation comes on and reappear as compensation is reestablished. In the light of our further experience, we suspect that digitalis may be responsible for the appearance of angina in many cases in which that drug is used to restore compensation.

9. von Neusser, E.: Angina Pectoris, New York, 1909.
10. Poynton, F. J.: Heart Disease and Thoracic Aneurysm, London, 1907.
11. Mackenzie, James: Diseases of the Heart, London, 1918.
12. Sailer, J.: Ann. Int. Med. **1**: 902 (May) 1928.
13. Levine, S. A.: Medicine **8**: 296 (Sept.) 1929.
14. Bell, Aaron; and Pardee, H. E. B.: Coronary Thrombosis, J. A. M. A. **94**: 1555 (March 17) 1930.
15. Allbutt, T. C.: Diseases of the Arteries Including Angina Pectoris, London, 1915.
16. Verdon, E.: Lancet **2**: 117, 1912.
17. Brooks, Harlow: Angina Pectoris, New York, Harper & Brothers, 1929.
18. Mathieu, L.: Rev. méd. de l'est, June, 1926, p. 356.

We have selected a few typical cases as illustrative of the clinical observation that angina pectoris may be connected with digitalis administration. We feel very reluctant to make any estimation of the relative frequency of this occurrence.

Such a subjective symptom as substernal pain or distress is hard to evaluate and may arise from so many different conditions that its tabulation as a whole might be very misleading.

Because of our early clinical observation, we have rarely used digitalis in angina and never early in coronary thrombosis. For this reason our observations have been infrequent in recent years. We have already mentioned the case that first directed our attention to this subject.

CASE 2.—A woman, aged 65, had suffered from occasional attacks of angina pectoris for a number of years. There was no cardiac pathologic condition that was not consistent with her age. Before she came under our observation, digitalis had been included in her treatment at intervals. Her daughter, who is a nurse, noted that the attacks became more frequent and more severe while the digitalis was included in the treatment. The digitalis was omitted, at the daughter's request, with a definite amelioration of symptoms. During the succeeding four years, with digitalis avoided and with the use of the salts of theobromine, the anginal attacks have been almost negligible. This patient died of pneumonia two years ago.

CASE 3.—A man, aged 58, who had a history of anginal seizures and a rather definite story of a coronary occlusion some months before coming under observation, entered the hospital with an advanced cardiac failure, a generalized edema, dyspnea and all the attendant conditions. After a course of treatment with the acid base salts, the purine base and mercurial diuretics, the edema was removed and compensation fairly well reestablished. At no time since his entrance to the hospital had he complained of substernal distress, nor had he anything resembling an attack of angina pectoris. At this point, the administration of digitalis was begun, powdered leaf, 0.4 Gm., being given daily for three days, followed by 0.2 Gm. daily for an additional two days. During the fifth night after the initiation of digitalis therapy, the patient had a definite and severe attack of angina pectoris. The digitalis was stopped at once, but the substernal distress and constriction of the chest continued for several days and there were two additional definite attacks of angina pectoris. The distress gradually disappeared, and before leaving the hospital the patient was able to walk as much as a mile without discomfort. The attacks occurred while the patient was confined to bed. He had a normal sinus rhythm throughout, and the pulse rate varied from 70 to 90 during his hospital residence and was unchanged by digitalis.

CASE 4.—A woman, aged 33, who had rheumatic carditis with auricular fibrillation, was under observation for five years preceding her death in 1922. During all this time she received digitalis in doses that seemed to be indicated by her state of cardiac efficiency. She became rather expert in regulating her own dosage and would remain away from the clinic for weeks at a time. She noted that at times she would have a sense of constriction in the chest and definite substernal distress. This was always relieved by omitting the digitalis for a few days and then returning to a somewhat smaller dose. We found that when the apical pulse was in the neighborhood of 100 she was free from this pain, but when the digitalis was increased so that the pulse was kept below 90, the pain almost invariably appeared. We do not believe that this small variation in pulse rate is sufficient to produce anginal pain.

CASE 5.—A man, aged 61, presented degenerative arteriosclerotic heart disease and auricular fibrillation. The patient had an extremely variable pulse rate. He would go for weeks at a time, with the pulse rate in the sixties and even below, without digitalis. Then, unaccountably, the pulse rate would advance to 100 or over. He had some anginal pain on effort

almost constantly but remained fairly comfortable while the theobromine salts were being taken. As the pulse rate increased above 100, signs of decompensation would appear and digitalis was started. The dose varied from 0.1 to 0.4 Gm. daily. Almost invariably the anginal pain would become definitely worse on about the third or fourth day of digitalis administration. This man was a clinic patient and occasionally received treatment at other clinics. On several occasions he was given digitalis, presumably because auricular fibrillation was found, and with no regard for the pulse count. On these occasions we found that, when the pulse rate was in the sixties, digitalis produced the same increase in pain as it did when the pulse was in the neighborhood of 100. Here, then, was a patient whose anginal pain was increased while taking digitalis when the pulse rate was 80 or more, and who was quite comfortable without digitalis with the pulse rate in the sixties. The increase in distress was so obvious that the patient himself would stop taking digitalis in order to become more comfortable. He died in 1930, we believe from a coronary occlusion.

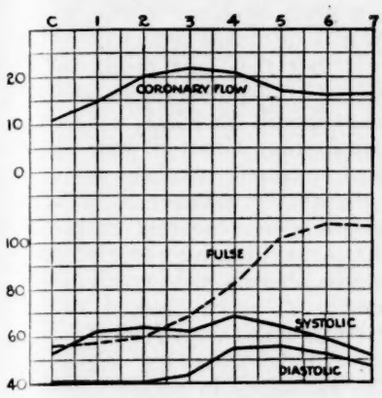

Chart 1 (control dog 46).—The coronary flow (shown in cubic centimeters per minute) rose perceptibly during the first forty minutes, although the blood pressure and pulse rate changed very little.

CASE 6.—A woman, aged 60, who did not show any definite cardiac pathologic condition and who had never before had anginal attacks, was given digitalis following a general physical examination and for reasons which are not clear to us. Shortly after the beginning of this treatment, she began to have substernal distress and severe attacks of angina pectoris. When she was seen in consultation, no definite cardiac pathologic condition could be demonstrated. The digitalis was omitted, and the attacks promptly ceased.

CASE 7.—A woman, aged 42, with rheumatic carditis and auricular fibrillation, had been receiving small amounts of digitalis over a long period of time. She entered the hospital in a state of mild decompensation. She had been receiving 0.1 Gm. of digitalis daily. The pulse rate varied between 70 and 100. The digitalis was increased to 0.3 Gm. daily. After four days the patient complained of attacks of substernal distress and pain that radiated to the left shoulder. The pulse variation remained unchanged. The digitalis was raised to 0.4 Gm. daily. This was done with the intention of observing the effect on the substernal distress.

Two days after the increase, the distress had become worse and the patient had a definite attack of angina pectoris. The attack yielded promptly to amyl nitrite inhalation. The digitalis was stopped, but the attacks of distress continued for about four days longer and there was one more definite attack of angina pectoris. After a week without digitalis, the distress had disappeared and the patient left the hospital free from all such symptoms. Following the increased digitalis dosage, the pulse rate varied from 60 to 80, and it remained in that vicinity at the time the patient was discharged from the hospital, free from pain.

We realize that one attack of angina or even one series of attacks is hardly conclusive evidence on which to base final judgment, but in those cases in which the value of digitalis was at least problematic, one does not feel justified in reproducing a condition that is not without an element of danger.

In the patients with auricular fibrillation, when digitalis therapy is definitely indicated, the pain was reproduced a number of times. It was reproduced in the first patient, who had a normal sinus rhythm, a number of times before we realized what was occurring and withheld the digitalis.

From the evidence presented here, together with many other observations of a similar nature, we are convinced that digitalis may produce anginal pain.

That the coronary flow is a function of blood pressure and pulse rate is a fact that seems to be well established. The effect of blood pressure on the coronary flow is universally accepted, but the effect of the variation of pulse rate within wide limits has been denied by some workers. Smith [19] and others are convinced that the pulse rate does have its effect on coronary flow, and our own observations [20] would confirm Smith's opinion. It is generally conceded, since the work of Sahli [21] and others, that the blood pressure is little altered by digitalis in therapeutic doses, so this factor may be eliminated as a cause for anginal pain in this instance. It might be argued, particularly in the cases of auricular fibrillation, that decrease in the pulse rate is a factor in producing coronary pain. It seemed to us that such insignificant changes in the rate as were observed can hardly be charged with this result, and in one case the pulse rate was faster when the pain appeared than it had been when the patient was free from pain, although the digitalis dosage was higher. Moreover, in those cases in which there was sinus rhythm the pulse rate was changed very little or not at all.

If the possible effect of changes in pressure and pulse is eliminated, it seems to us that constriction of the coronaries is the only remaining logical hypothesis on which to base the occurrence of anginal pain. There is no reason to suppose that this action would be in any way altered by the presence of a coronary occlusion, and we cannot see any reason to doubt the unfavorable result of an active vasoconstriction on such a heart.

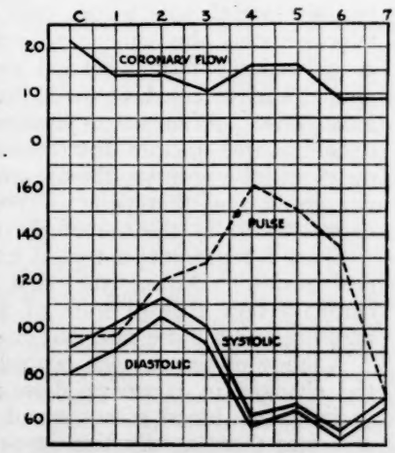

Chart 2 (dog 58).—Reduction of coronary flow after administration of whole leaf preparation number 1; rise in blood pressure and pulse rate.

In order to establish an experimental and pharmacologic basis for our clinical observation, we began about two years ago a series of experiments on the intact animal. Reports concerning experimental work with digitalis and the coronaries are numerous and conflicting. The literature has been sufficiently reviewed in previous articles by others and need not be dealt with here. In our experiments we used dogs of about 6 Kg. and measured the outflow from the coronary sinus by a method previously described.[22] No attempt was made to control blood pressure or pulse rate but, in all other

19. Smith, F. M.: The Coronary Circulation, Arch. Int. Med. **40**: 281 (Sept.) 1927.
20. Gilbert, N. C., and Fenn, G. K.: Effect of Digitalis on Coronary Flow, to be published.
21. Sahli: Cong. f. inn. Med. **19**: 142, 1901.
22. Gilbert, N. C., and Fenn, G. K.: The Effect of the Purine Base Diuretics on the Coronary Flow, Arch. Int. Med. **44**: 118 (July) 1929.

details, conditions were kept constant for a given experiment. A vasoconstrictor action was considered present only when it occurred in the face of a rising pressure or pulse, factors which would tend to increase the coronary flow.

In a series of thirteen dogs, every condition of the experiment was fulfilled except the administration of the drug. In this control group there was not a single instance in which variation of the coronary flow could not be explained by changes in pulse or pressure.

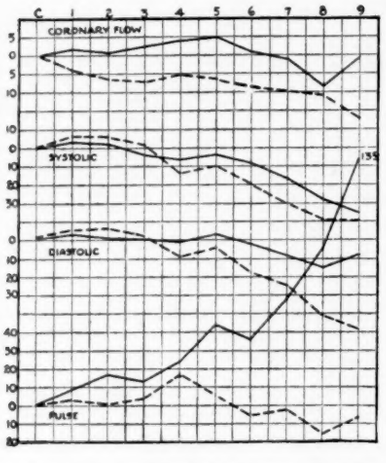

Chart 3.—Arithmetical average of series of animals receiving whole leaf preparation number 1, compared with similar arithmetical average of control group. The control group is represented by the solid line and the digitalized group by the broken line.

In all other animals, some 100 in all, some standardized preparation of digitalis or one of its allies was given. In order to make these experiments comparable one with another, the lethal dose of the preparation to be used was estimated at the beginning of the experiment. After the preparation had become stabilized and control readings made, one tenth of the estimated lethal dose was injected every ten minutes until death ensued. The accuracy of the estimated dose was demonstrated by the fact that all animals died within the limits of error of biologic assay. In the control group, readings of the coronary flow, blood pressure and pulse rate were made and charted at ten-minute intervals. In the digitalized group, corresponding readings were made before each injection of drug, at approximately the same time interval. We have not considered the results beyond the point at which the animal had received from 30 to 40 per cent of the lethal dose. After the expiration of this time, many uncontrollable factors have entered into the experiment, and the ordinary therapeutic use of digitalis does not go beyond this point. The results can best be demonstrated by the use of charts.

Chart 1 represents a typical experiment in the control series. During the first forty minutes, the coronary flow rose in spite of a very constant blood pressure and a pulse rate that changed very little.

A study of the thirteen control animals showed that the changes in coronary flow followed directly the variations in blood pressure and pulse rate and in no case was there a reduction in coronary flow that was not accounted for by these factors.

Chart 2 represents the result of an experiment showing a reduction in the coronary flow. This animal was injected at ten minute intervals with a standard commercial tincture of digitalis which we have designated whole leaf preparation number 1. The coronary flow shows a constant reduction from its control level, while the blood pressure and pulse rate move in an upward direction.

Of twenty-five animals that received this preparation, twelve showed a reduction of the coronary flow that could not be accounted for by changes in the pulse or pressure. Of the remaining thirteen, nine showed decreases in flow and four showed increases in flow that followed directly corresponding changes in pulse or pressure.

Chart 3 represents an arithmetical average of this last series of animals compared with a similar arithmetical average of the control group. The solid line represents the control group and the broken line the digitalized group. In spite of pressures and pulses that correspond very closely, the coronary flow in the control group shows a slight tendency to rise, while in the digitalized group it is distinctly reduced.

To assure ourselves that the same result followed the administration of other digitalis preparations, we performed similar experiments in which a variety of preparations were employed. Chart 4 was obtained from an animal that received another commercial tincture, whole leaf preparation number 2. The same reduction in coronary flow is observed, in this case accompanied by a sharp rise in pulse and a slight rise in pressure. Of twelve animals that received whole leaf preparation number 2, seven showed reduction in coronary flow that was unaccounted for by change in pressure or pulse. In the remaining five animals, the flow followed the variations in pressure or pulse.

Twelve animals were given ouabain obtained from the Bureau of Standards. In five of these animals the coronary flow was reduced without corresponding change in the pressure or pulse. In six of the remaining animals the flow followed variations in pressure or pulse, and in one the flow was unaccountably increased.

In addition to the preparations already mentioned, a commercial ouabain, American digitoxin and German digitoxin were employed, all with similar results.[23] This vasoconstrictor action was totally abolished when the vagi were sectioned a few days preceding the experiment, or when the vagi were paralyzed with atropine immediately preceding the experiment. The detailed results of this problem have been reported elsewhere.[20]

These results would seem to justify our contention that digitalis is capable of producing anginal pain. That constriction does not occur in every case does not appear to us to be surprising. The action of digitalis is dependent on a great number of variables and the regulation of the coronary flow is under a very complicated mechanism, and every automatic adjustment must be brought to bear to prevent the occurrence of a condition that is of such great physiologic disadvantage to the organism. That it does occur in some cases seems to us to be beyond question, but we have discovered no way to forecast its occurrence in any given case.

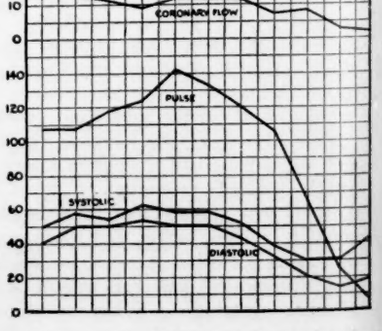

Chart 4 (dog 186).—Reactions after the administration of whole leaf prepration number 2. Note reduction of coronary flow, accompanied by sharp rise in pulse and slight rise in blood pressure.

23. A third commercial preparation of whole leaf which has been subjected to a special process and the exact composition of which we do not know produced digitalis-like action in all other respects, but showed a vasoconstriction of the coronaries in but one of eleven animals. This suggests qualitative differences in digitalis preparations that we are unable to comment on at the present time but hope to report on later.

Digitalis is therefore capable of producing anginal pain by means of constriction of the coronary arteries, but this phenomenon will not occur in every case, nor can its occurrence be predicted in any given case.

104 South Michigan Avenue.

ABSTRACT OF DISCUSSION

DR. SOMA WEISS, Boston: Drs. Fenn and Gilbert have called attention to a group of patients who, coincident with the administration of digitalis, develop precordial pain. Such cases certainly exist. However, it is far more usual to find that patients having coronary sclerosis with mild or severe degrees of decompensation benefit from digitalis, without development of further or more intense pain. It is not an uncommon occurrence that patients with coronary sclerosis and angina or with paroxysmal dyspnea lose their pain or attacks of dyspnea with the onset of congestive failure. The most plausible explanation for such development is, as also supported by recent measurements of the velocity and volume blood flow in the periphery and lungs made recently in the Boston City Hospital, that during the stage of angina or paroxysmal dyspnea the peripheral blood flow is often normal in every respect, while an increased amount of blood and decreased velocity exist in the pulmonary circuit. Such a state of affairs keeps the left ventricle under constant strain and maximum activity; and because of the frequent presence of coronary sclerosis, narrowing of the coronary opening and hypertrophy of the myocardium in patients with angina, a disproportion exists between muscle function on the one hand, and coronary blood flow and oxygen supply of the left ventricle on the other. Such an absolute or relative anoxemia, just as in the peripheral musculature, leads to pain. When, later, the right side of the heart begins to fail, stagnation and slowing of the blood flow occurs in the periphery, as judged from observations on the venous pressure and velocity of blood flow. The cardiac output often decreases without change in the arterial blood pressure or in the heart note. The nutrition of the myocardium under such conditions improves, the anoxemia disappears and with this the angina subsides. Is it not one probability, or at least a possibility, that digitalis, especially in the presence of pathologic changes in the coronary arteries and decreased coronary vascular reserve, in a converse manner, by improving the extracardiac circulation, induces a relative or absolute anoxemia in these patients? Such an anoxemia may also be induced by digitalis by increasing the stroke volume, regardless of whether the minute volume output of the heart is increased or decreased. The balance between the work and blood supply of the myocardium in a given time unit determines the oxygen supply of the cells of the musculature. Digitalis occasionally may also produce precordial discomfort by inducing cardiac irregularities. In the presence of coronary sclerosis or angina, digitalis, I believe, is not contraindicated, unless experience in the individual case indicates that it is harmful. Thus in digitalis therapy one is dealing with a situation in which one has to use judgment in estimating the comparative effect of digitalis on the intracardiac and extracardiac circulation.

DR. J. B. WOLFFE, Philadelphia: It seems that if one finds carefully recorded clinical observations made by such men as have presented their work today, and if their results failed to conform to the accepted opinions, one is justified in questioning the physiologic principles involved, and try to correlate the fundamental with the clinical observations. In analyzing clinical results obtained by the use of drugs one must keep two important factors in mind: First, are the symptoms for which the patient is treated (not the etiology) predominantly due to parasympathetic or sympathetic preponderance? Second, what is the action of the drug employed on the autonomic nervous system or its representative metabolites? Is the drug of an "inhibitor" type in relation to an organ or a group of organs or an "accelerator"? I have been working with a hormone which appears to be an antagonist to epinephrine, and probably an antagonist to the entire group of "inhibitor" drugs such as atropine and calcium. This substance has been employed by a number of European investigators. My experiments and the results of their experiments are very similar, and yet my deductions, indications, contraindications and proper clinical application are at variance with theirs. I therefore had to look for an explanation and came to some of the conclusions which I referred to. If time permitted I would be able to point out a few of the most important fundamentals which would at least give a clue in the proper direction, would explain the observations of Fenn and Gilbert, and would suggest a method for investigation in order to determine whether one patient belongs to the "accelerator" group, and therefore one type of drug should be employed, or the "inhibitor" group, and therefore that drug should not be employed. This morning in making rounds with some of the men in the hospital, I tried to point out two types of parkinsonian cases, one of the "accelerator" and one of the "inhibitor" type. As long as one fails to recognize this fundamental principle, one will fail to treat these patients properly. One will obtain good results in but 50 per cent of the cases. It seems important, therefore, to classify patients into "inhibitor" and "accelerator" types, although these terms are hardly adequate to express just the processes concerned, and to treat them accordingly. The mystery of the fact that certain drugs act in one patient and not in another suffering from the same malady may thereby be solved.

DR. DAVID I. MACHT, Baltimore: At the last annual meeting of the Federation of Biological Societies, which met in Montreal during the Easter vacation, I presented a communication before the American Physiological Society concerning the influence of barometric changes and other meteorological conditions on the potency of digitalis for cats. For the past five or six years, I have been investigating the influence of various factors on the reliability of the cat method for digitalis assay, and I have noted certain very interesting phenomena in this connection which I was loath to make public before I had accumulated an abundance of data. These have just been announced for the first time in the Proceedings of the Physiological Society. It was found that when a given tincture of digitalis is assayed by the Hatcher-Brody method at sea level, in the city of Baltimore, for instance, and the average lethal dose thus obtained is compared with the average lethal dose for the same tincture obtained at about the same time in the mountains, that is, in a place where the barometric pressure is distinctly lower than at sea level, the lethal dose obtained in the latter is smaller than that obtained in the former locality. In other words, the potency of digitalis is greater when the barometric pressure is low than when it is high. Five sets of such experiments have been performed in several mountain districts and in each place it was found that the same tincture gave lower or more toxic figures at high altitudes than at sea level. This difference in the toxicity or potency of digitalis is not due to changes in the preparation itself, because when such a tincture is again assayed at a lower level the original figures are obtained. The difference in the toxicity, or the greater sensitivity of digitalis, is due to changes in the physiologic functions of the cats and more particularly to changes produced in the respiration and circulation by the fall in the barometer. My assistants and I have kept systematic records of figures obtained by assaying digitalis on cats in Baltimore under various weather conditions, and here again it was found that when such violent atmospheric disturbances were taking place as occur during a severe storm or a hurricane, the effect of digitalis on cats, as studied by the Hatcher-Brody method, gave very abnormal readings. Not only do changes in the barometric pressure produce fluctuations in the potency of digitalis for cats, but we have also noted variations in the potency of the drug produced by excessive changes in humidity and other meteorological factors. My observations on digitalis and on certain other drugs, in this connection, make me feel that fluctuations in the barometric pressure and other changes in atmospheric conditions may have an important bearing on the action of various drugs, which is of interest not only from a purely scientific point of view but also from the standpoint of practical therapeutics.

DR. HYMAN I. GOLDSTEIN, Camden, N. J.: I simply want to ask the question whether in those digitalized patients an

attempt was made to relieve the pain by theophylline ethylenediamine, deinsulinized pancreatic extract, or muscle extract, because if the pain in those cases was relieved it would tend to favor the opinion that the coronary flow was changed in those special cases, separating the small group that Dr. Macht mentioned in which there was an opposite effect. Nielsen (*Ugeskrift for Læger* **93**:240-243 [March 5] 1931) has recently employed the heart hormone extract "lacarnol" in forty-seven patients (eighteen with true angina pectoris). Twelve of these patients have been free from anginal attacks for three months or more. In some decompensated cases, much smaller doses of digitalis were required, because of the good effect of the cardiac hormone extract (beef heart muscle extract). Thus, the use of this tissue extract would prevent the painful experiences caused by the larger doses of digitalis, as reported by Fenn and Gilbert.

DR. A. I. RUBENSTONE, Philadelphia: The question of development of anginal pain during digitalis therapy should be further studied, especially on the heart muscle that is not edematous. Many of the patients seen in our clinics and in the home and those brought in for hospitalization are preclinically decompensated, though on physical examination they give little evidence of decompensation; for instance, in these one finds many who have no swelling of the legs or wet lung bases or hepatic enlargement that speaks for definite clinical decompensation, but there are râles at the lung bases while the patient is lying that disappear soon after he assumes the sitting posture, and those who after a few hours' sleep awaken in order to use the auxiliary muscles of respiration to overcome the slight dyspnea and cyanosis. It is because of this that patients often feel better some time after arising from bed in the morning than when actually asleep. These patients usually have no pitting edema of the skin but their water balance is disturbed and they have an insensible tissue edema. I feel that smaller doses of digitalis would probably accomplish as much as the larger doses if salt and water restriction were kept in mind during such experiments. To evaluate properly the rôle digitalis plays in producing anginoid attacks, controlled experiments with proper water balance in the body would prove interesting.

DR. G. K. FENN, Chicago: I don't want Dr. Weiss to believe that we think digitalis is of no value. We use a lot of digitalis. Nor do we wish to leave the impression that pain occurs in all cases or even a high percentage of cases. If I follow Dr. Weiss's argument, coronary sclerosis must be present in order that pain may be produced. It is very difficult to say whether or not a patient has coronary sclerosis. In many cases we are quite sure they have and in many others we are equally certain that they do not have, but of course the ultimate proof lies in the conditions found at autopsy. Nor do we wish to put forward the argument that digitalis is definitely contraindicated in angina. Our principal reason for not using it was that we couldn't see that it would do much good and that at the same time it is capable, but not certain, of doing harm. I believe our work will bear out Dr. Wolffe's idea about inhibitor and accelerator mechanisms. There is some unexplained underlying factor that accounts for the great variation in the response to digitalis. Of course, Dr. Gilbert and I are quite familiar with Dr. Macht's work. One reason we were willing to step out so freely was that we had good experimental support. In these experiments, all the whole leaf preparations were tinctures. In the treatment of the anginal attacks a number of drugs were used, morphine, the theobromine group, and glyceryl trinitrate. It is difficult to say which was effective. I believe that would also answer Dr. Goldstein's question. We believe that theophylline ethylenediamine and the other purine base compounds are effective and have so stated in another communication; but it would be difficult to draw conclusions from this series. We have had experience with tissue extracts.

DR. T. R. HARRISON, Nashville, Tenn.: My experience has been somewhat different from Fenn and Gilbert's. I have often believed that patients with angina had fewer attacks when receiving digitalis. Possibly this difference is due, as Dr. Macht suggested, to the fact that I have used only the whole leaf whereas Fenn and Gilbert have used the tincture.

SCOLIOSIS

ETIOLOGY, PATHOGENESIS AND PREVENTION OF EXPERIMENTAL ROTARY LATERAL CURVATURE OF THE SPINE *

EBEN J. CAREY, M.D.
MILWAUKEE

There is an absence of accurate anatomic and physiologic knowledge of the mechanism of production of structural scoliosis. Beginning with Hippocrates, who gave the generic name "scoliosis" to any twisted spine, many volumes have been written on the condition that is now known definitely as rotary lateral curvature of the spine. Most of the evidence presented, however, has consisted of end-results of pathologic processes, the causes and starting point of which have been obscured or obliterated in the majority of patients with scoliosis.

Excellent experimental work and observations on human and animal subjects that have advanced knowledge of the causes of scoliosis have been done by Lovett,[1] Brackett,[2] Scudder,[3] Schulthess,[4] Wullstein,[5] Arnd,[6] Thompson and Mendel,[7] Müller,[8] Abbott,[9] Bardeen,[10] Bucholz and Osgood,[11] Kleinberg,[12] Wilson,[13] Steindler,[14] Bohm,[15] Feiss,[16] Nathan,[17] Buchmann [18] and Calvé.[19]

The results of experimental amputations, selective muscle and nerve excisions, tail fixation, undernutrition in young animals, and the dynamics of histogenesis of muscle, bone and joint have been presented [20] in the

* From the Department of Anatomy, Marquette University School of Medicine.

* Read before the Milwaukee Academy of Medicine in December, 1930, and before the American Association of Anatomists in Chicago, April 2, 1931.

* Read before the Section on Orthopedic Surgery at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.

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Scientific Exhibit at the annual sessions of the American Medical Association in 1928, 1929, 1930 and 1931. The biophysical relationship of muscle and bone during the periods of growth and maturity exposed by the experimental method led to a restudy of the normal and abnormal actions of antagonistic muscles that influence either directly or indirectly the position of the spine. A working model of the anatomic and physiologic relations of muscle and bone levers of the normal human back was then constructed. By this means results of experimental muscular imbalance registered at once in the spinal indicator, whereas by animal experiments I have waited months and even over a period of two years for the same changes to occur.

The objective part of the experimental work presented in this paper, therefore, will be confined to certain demonstrations on the dynamic muscle-bone balance model of the human spine. Emphasis is placed on the normal and abnormal dynamic equilibrium of the bilateral musculature of the body as a whole. The interaction of the muscles and the segmental bones of the axial and appendicular skeleton under normal conditions is manifested by body symmetry and under abnormal conditions by variable kinds and degrees of asymmetry.

ETIOLOGY

Scoliosis is a spinal sign of the muscle-bone imbalance of the back and is not a specific disease entity. There is, therefore, no single etiologic agent producing scoliosis. Multiple factors may cause comparable spinal curvatures by upsetting the dynamic equilibrium of the motor system of the back, just as different pathologic conditions may produce the symptom of fever. The kind and degree of scoliosis are dependent on the extent of imbalance caused by the possible multiple combinations and permutations of the paralyzed muscles of the body as a whole.

In both the functional and the structural types of scoliosis, there is a reaction of the spinal indicator to the normal and abnormal dynamic balance of the bilateral body muscles. The degree of rotation about a vertical axis and the extent of the lateral deviation of the spine from the midline are direct indications of the degree of imbalance of different groups of body muscles. There is no direct correlation between the rotary and the lateral deviation components of the rotary lateral curvature of the spine. In one individual the rotary element may predominate; in another, the lateral deviation is dominant. These changes are dependent on the involvement of different combinations of muscle groups.

The dynamic equilibrium of the muscle and bone of the back, leading to permanent structural changes in the bodies of the vertebrae, intervertebral disks, ribs, shoulder and pelvic girdles and lower extremities, may be upset by different pathologic conditions in the following systems of the body: (1) digestive; (2) blood and lymph vascular; (3) respiratory; (4) excretory; (5) nervous; (6) osseous; (7) joint, and (8) muscular systems. Congenital changes that are the result of arrested growth or overgrowth of certain bones or muscles cause alterations of normal balance of the motor system of the back.

Variot [21] has demonstrated the frequent dissociation of statural and ponderal growth in the human infant during chronic infantile inanition. Growth in muscle weight was retarded more than growth of the skeleton in length. In severe cases the height increased while weight was stationary or even decreased. This dissociation was definite in premature infants, twins and weaklings, especially an atrophy of gastro-intestinal origin. He also demonstrated a physiologic dissociation of height and weight growth during the normal postnatal loss in body weight. Freund [22] stated that acute infections depress weight with no cessation on growth in height. The question of abnormal uncorrelated growth of weight and height has been reviewed by Schloss,[23] Tobler and Bessau [24] and Jackson.[25]

In chronic inanition in albino rats Jackson [26] found that "with a body loss of 36 per cent the musculature lost 41 per cent in weight (table 4)." Miescher [27] recorded that in the fasting Rhine salmon the sex glands develop at the expense of the musculature, which lost over 50 per cent in weight. The superficial lateral trunk musculature was definitely degenerated while the remaining muscles appeared relatively unaffected. This observation was confirmed by Greene [28] in the Pacific salmon.

Aron [29] noted that in an underfed puppy the musculature formed only 29.3 per cent of the body weight, which in a full fed litter mate was 50.2 per cent. Thompson and Mendel [7] stated that in underfed albino mice the characteristic curvature of the spinal column was caused by arrested growth of the skin and muscle, together with the persistent growth of the vertebral skeleton.

Gaglio [30] noted a loss of 85 per cent in the musculature of a starved frog with loss of 50 per cent in body weight. Ott [31] found that in the female the loss in the musculature was even greater in the earlier stages of inanition than in the male frog. Stefko [32] during the recent Russian famine recorded that girls showed a greater loss in body weight than boys.

Ohlmüller [33] and Theile [34] reported that the atrophic child loses a greater percentage of muscle weight than the total percentage of loss of body weight. Nicolaeff [35] stated that variation occurred in the amount of atrophy in the individual muscles of famine stricken children. The functionally active muscles of mastication (temporal, masseter) lost relatively less than the biceps brachii, which sometimes lost 50 per cent in weight.

21. Variot, G.: La dissociation de la croissance dans l'atrophie et l'hypotrophie infantile: Atrophie ponderale; atrophie staturale, Rev. internat. de méd. et de chir. **19**: 41, 1908.

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24. Tobler, L., and Bessau, G.: Krankheiten durch abnorme Ablauf der Ernährungsvorgange und des Stoffwechsels, in Brüning and Schwalbe's Handbuch der allgemeinen Pathologie und pathologischen Anatomie des Kindesalters **1**, part 2, chapter 9, p. 650, 1914.

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35. Nicolaeff, L.: Influence de l'inanition sur la morphologie des organes infantiles, Presse méd. **31**: 1007 (Dec. 1) 1923.

Statkewitsch [36] studied the microscopic changes in the muscle and other tissues during inanition in numerous animals (mammals, birds, reptiles and amphibians) and gave a detailed review of the earlier literature. He found that in general the skeletal muscle was affected earlier and more intensively than smooth muscle. The

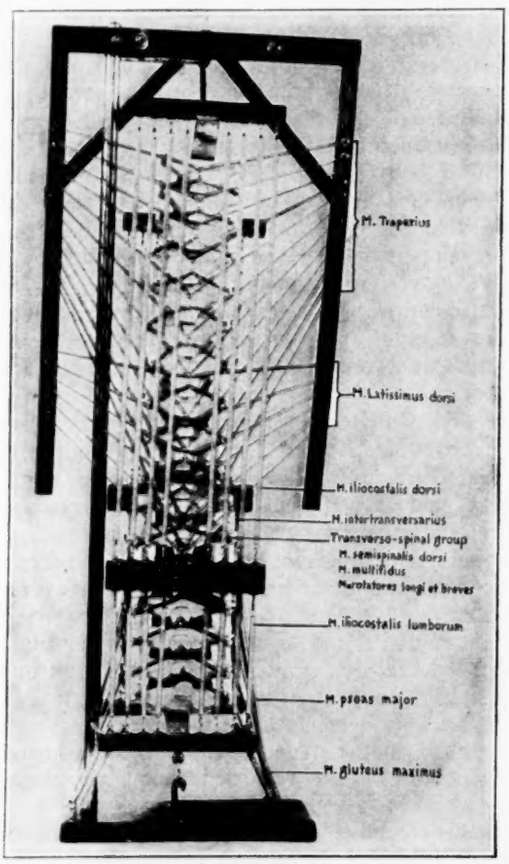

Fig. 1.—Dorsal aspect of the dynamic muscle-bone balance model of the human spine (about one-fifth natural size). The spine has no direct solid support but is suspended in a field of bilaterally balanced tensions of steel wire springs. The twelve dorsal and five lumbar vertebrae are composed of oak wood and between the vertebrae are placed disks of felt which represent the intervertebral disks. Dorsad to the center of the vertebral bodies is a hole through which is threaded a wire spring one-fourth inch in diameter. This axial spring is attached above and below to the stand and permits mobilization of the vertebral bodies in relation to one another.

degenerative changes appeared first in the cervical musculature, then (in order) in the extremity muscles, the pectoralis major, the heart, the rectus abdominis, and finally the smooth musculature. I confirmed this in the Scientific Exhibit in 1930 in unpublished records of autopsy determinations of muscle weights in marasmic infants, in which there was found a definite inequality of degeneration of the muscles on the left and right sides of the body.[20]

Baker [37] conducted an investigation for the Bureau of Child Hygiene and determined among 171,691 school children 18.5 per cent definitely undernourished and 3.1 per cent with pronounced malnutrition or marasmus, or a total of 21.6 per cent with distinct undernourishment. Up to 6 years of age, 22.5 per cent were undernourished, and at 9 years 25.2 per cent. This condition probably held, according to Baker, for one million school children of New York City. Brown [38] found that 41 per cent of the children in Lowell School of Kansas City were more than 10 per cent underweight.

Malnutrition and partial inanition were therefore very common among children, even under relatively normal conditions. Despite underfeeding or malnutrition there was a persistence of skeletal growth with a great loss of muscle weight. This resulted in dystrophic growth. The extent of muscle degeneration, furthermore, varied greatly not only in different fibers of the same muscle but also in the muscles in the different regions of the body.

The musculature was not, therefore, uniformly degenerated in the undernourished child but presented a condition of focal atrophy. The definite atrophy of the musculature explains the characteristic weakness which generally appeared in both total and partial inanition, as well as in various chronic diseases involving malnutrition. Infantile malnutrition was very common and varied in character and in degree of severity. When pronounced, it was called by various names, such as infantile atrophy, athrepsia, inanition, cachexia, marasmus, hypotrophy, pedatrophy, decomposition and denutrition.

This dystrophy of decreased muscle growth and persistent skeletal growth in the undernourished child, therefore, results in focal atrophy of different muscle

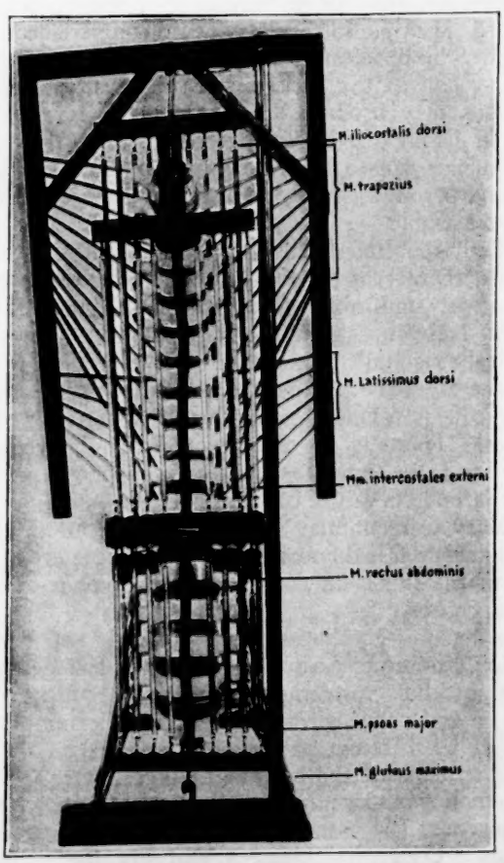

Fig. 2.—Ventral aspect of the dynamic muscle-bone balance model of the human spine (about one-fifth natural size). The spine has no direct solid support but is suspended in a backpressure field which is a resultant of the bilaterally balanced spring tensions. The black elastic band extending vertically over the midventral aspect of the bodies of the vertebrae represents the middle longitudinal ligament.

groups with a resultant asymmetrical pull or unequal decompression of direct and indirect muscle action on

36. Statkewitsch, P.: Ueber Veränderungen des Muskel- und Drusengewebes, sowie der Herzganglien beim Hungern, Arch. f. exper. Path. u. Pharmakol. **33**: 415, 1894.

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the spine. The class of idiopathic scoliosis, which is more prevalent in girls than in boys and which constitutes, according to Kleinberg,[12] 85 per cent of the total number of lateral curvatures of the spine, may well be due to the imbalanced action of the bilateral antagonistic musculature resulting from undernutrition or

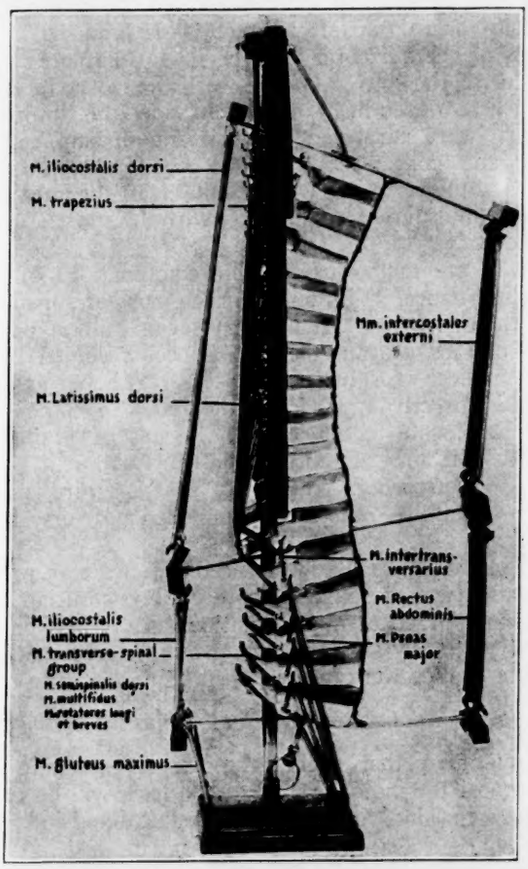


Fig. 3.—Lateral aspect of the dynamic muscle-bone balance model of the human spine (about one-fifth natural size). The spine has no direct solid support but is suspended in a backpressure field produced by the bilaterally balanced tensions of steel wire springs. The ventral concavity in the thoracic and the ventral convexity in the lumbar regions are produced by differential tensions of the steel wire springs. The transverse wooden bars represent the upper and lower limits of the thoracic cage and the pelvis, the pubis ventrad and the sacrum, ilium and ischium dorsad. The ventral convexity of the lumbar region of the spine is the result of the two muscular forces, (1) the bowstring effect of two powerful muscles, the sacrospinales and their synergists, and (2) the ventral traction of the psoas majores. The ventral convexity of the cervical vertebrae is likewise a result of the bowstring muscles of the back of the neck. The lumbar and cervical compensatory curves are developed with the increase of power of the dorsal spinal extensor musculature in maintaining the spine erect. The cervical convexity develops from three to six months after birth when the head is flexed and maintained in the upright extended position when the child begins to sit unaided. The lumbar curve develops from nine to twelve months after birth with the ability of the growing child to sit, stand and walk with the spine vertically placed.

malnutrition during the first decade of life. There is a definite correlation between the incidence of malnutrition and partial inanition of the child during the first decade of life and that of scoliosis without a definite cause, which is exposed by the statistical method.

PATHOGENESIS

The mechanism of production of the different degrees and types of rotary lateral curvature may be best studied by means of the dynamic muscle-bone balance model of the human spine. This model of the dorsolumbar vertebrae of the human spine in wood and related musculature in steel wire springs was constructed in order to visualize the interdependence and interactivity of the bilateral and unilateral muscular actions in relation to the spinal column indicator. The spinal column is demonstrated to be a dynamic indicator of myogenic equilibrium, the result of neurovestibular control on the bilateral muscles pulling against the resistance of gravity.

This results in body symmetry or asymmetry of balanced or imbalanced muscular activities, respectively. The spine and its neuromuscular relations constitute a functional unit and are roughly analogous to the indicator and its relation in the balance scales. The spinal indicator may, however, be laterally deviated to the stronger or to the weaker muscle side. This depends on whether or not the parallel bowstring or the transverse-traction muscles, acting directly or indirectly on the spine, are unilaterally stronger than a weakened antagonist on the opposite side of the body.

In figures 1, 2, 3 and 4 the axial spine is shown in different aspects in relation to the musculature. I have reclassified the musculature that influences spinal position on a physiologic basis, with examples in each class, as follows:

1. The superficial parallel bowstring muscles: rectus abdominis, intercostals, sacrospinalis muscles.
2. The deep parallel bowstring muscles: intertransversarii.
3. The superficial transverse-traction-torsion muscles: trapezius, latissimus dorsi, serratus anterior and pectoralis major muscles.
4. The deep torsion muscles: semispinalis, multifidus, long and short rotator muscles.

In the primary curvature the convexity of the spine was toward the strong muscle side when the superficial transverse-traction-torsion muscle was unilaterally weakened (figs. 5, 7 and 9). If the right trapezius muscle was weakened or paralyzed, the overaction of the unopposed left trapezius muscle drew the convexity of the spine toward the left side (figs. 5 and 7). The unopposed action of the right trapezius muscle pulled the convexity of the spine toward the right side (fig. 9).

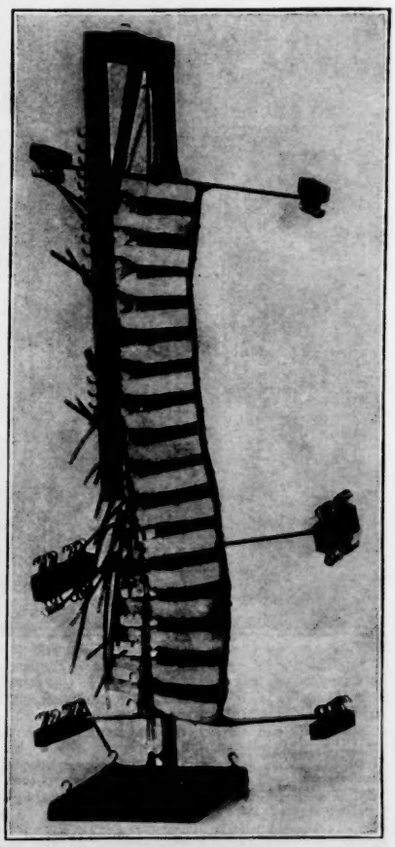
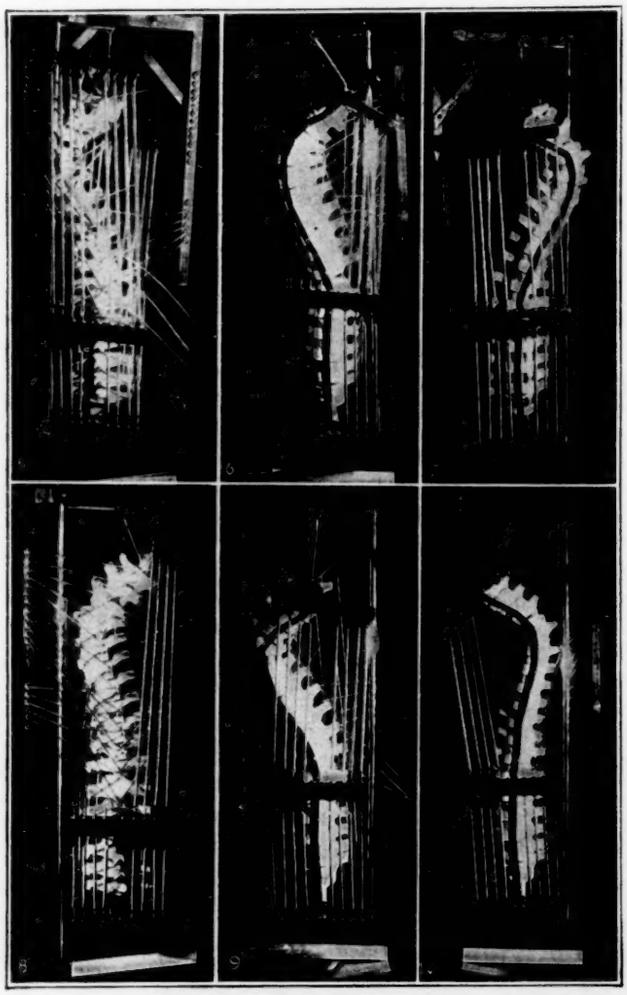


Fig. 4.—Ventrolateral aspect of the dynamic muscle-bone balance model of the human spine (about one-fifth natural size). The spine is stripped of all tensions of the steel springs and the mechanical resultant of the backpressure of spring pull.

When the superficial parallel bowstring muscles of the body were weakened or paralyzed, the convexity of the spine was directed toward the weakened side (figs. 6, 8 and 10). If the right external intercostal muscles or the rectus abdominis muscle was weakened or paralyzed, those on the left side acted as a bowstring and forced the convexity of the spine to the opposite

or right side (figs. 6 and 10). The convexity of the spine was directed to the left side when the left iliocostalis dorsi muscle was paralyzed. This was due to the unopposed action of the right parallel bowstring muscles (fig. 8).

When the right intertransversarii and the right transversospinal muscles were weakened or paralyzed the unopposed action of the muscle group of the left side caused a right convex scoliosis with a rotation of the bodies of the vertebrae to the side of the convexity (figs. 11, 12 and 13). In this case, convex-sided torsion of the bodies of the vertebrae was a resultant of the imbalanced action of the deep torsion muscles of the spine.



Figs. 5 to 10.—Dorsal and ventral aspects of the dynamic muscle-bone balance model of the human spine (one-twelfth natural size). The left lateral scoliosis is produced by the release of the springs on the right side which represent the trapezius muscle (fig. 5). The right lateral scoliosis in the dorsal region is produced by the release of the springs on the right side which represent the right external intercostal muscles (fig. 6). The left lateral scoliosis in the dorsal region is produced by the release of the springs which represent the right trapezius muscle (fig. 7). The left lateral scoliosis in the dorsal region is produced by the release of the springs on the left side which represent the left iliocostalis dorsi muscle (fig. 8). The right lateral scoliosis in the dorsal region is produced by the release of the springs on the left side which represent the left trapezius muscle (fig. 9). The left lateral scoliosis in the dorsal region is produced by the release of the springs on the left side which represent the left external intercostal muscles (fig. 10).

Definite torsion of the vertebral column and relatively little lateral displacement were produced when the transversospinal muscles were unilaterally weakened or paralyzed (figs. 14, 15, 16 and 17). By the elimination of the action of the superficial muscles of the body, the pure effect of the deep torsion muscles was demonstrated. By releasing the action of the right transversospinal muscles, the unopposed action of the left ones rotated the bodies of the spine to the opposite or toward the right side (figs. 14 and 15). The reverse effect was produced when the left transversospinal muscles were released from action. The overacting right transversospinal muscles rotated the bodies to the opposite or to the left side (figs. 15 and 16). The bodies of the vertebrae may be made to rotate toward the side of the convexity or toward the concavity of the curvature, depending on which side the intertransversarii were paralyzed. The lateral deviation of the spine and concave and convex-sided torsion of the bodies of the vertebrae were resultants of the imbalanced actions of different combinations of the muscle groups of the body.

There are numerous possible combinations of muscular imbalance. With only thirteen pairs of spinal muscles there are more than sixty-seven million possible combinations of muscular imbalances resolved by the mathematical formula $(2^n - 1)$. There are 144 muscles directly attached to the movable spine. The mind is unable to conceive the result of multiplying out to the one hundred and forty-fourth power: $2 \times 1 = 2$ (second power) $\times 2 = 4$ (third power) $\times 2 = 8$, and so on to the one hundred and forty-fourth power.

Different groups of imbalanced muscles may produce the same type of spinal curvature. The clinician meets a definite practical difficulty, therefore, when he tries to assign to any single muscle group or combination of muscle groups the cause of a specific curvature of the spine.

PREVENTION

Any agent that upsets the normal dynamic equilibrium of the motor system of the back will be evident in the spinal indicator of muscle balance and imbalance. The motor system of the back is maintained in normal balance by the functional integrity of the blood, nerves, muscles, tendons, bones and joints. These six anatomic phases form a physiologic system of motion. During the first decade of life, even under apparently normal conditions there is found by Baker [37] an undernourishment in 25.2 per cent of school children before 10 years of age. This results in a dystrophy of muscle and bone growth. The dominant muscular atrophy is focal and asymmetrical. This dissociation of muscular and skeletal growth is more dominant in girls than in boys.

This focal muscular atrophy and paralysis of undernutrition will upset the muscle-bone balance of the normal spine and may well be the insidious cause of idiopathic scoliosis. The problem of scoliosis is then a problem of prevention of all conditions that upset the normal balance of muscle and bone during growth. This has been proved by Müller [8] and myself [20] on experimental animals in the production and prevention of myogenic scoliosis. Steindler [14] has a similar point of view in preventing structural scoliosis by the elimination of those generalized debilitating conditions that he designates prescoliosis.

CONCLUSIONS

1. Scoliosis is a spinal sign of the imbalance of muscle and bone growth of the motor system of the back and is not a specific disease entity. The kind and degree of scoliosis are dependent on the extent of the imbalance, caused by the weakening and possible paralysis of multiple combinations and permutations of the muscle groups of the body as a whole. Accurate

anatomic and physiologic knowledge of the motor system of the back as a functional whole is necessary for an understanding of pathologic changes in the spine.

2. In chronic infantile inanition and malnutrition there is a decrease in muscle weight and a persistence in skeletal growth in length. The muscles do not degenerate uniformly. This asymmetrical focal muscular atrophy and localized muscular weakness or paralysis of the undernourished child are more pronounced in girls than in boys. This results in unequal pull on the spine and the striking of an abnormal muscle-bone balance. This inequality of muscular atrophy and paralysis upsets the normal dynamic equilibrium of the muscle and bone growth of the spine. Chronic underfeeding or malnutrition of the child during the first decade of life is, therefore, suggested as the insidious cause of idiopathic structural scoliosis.

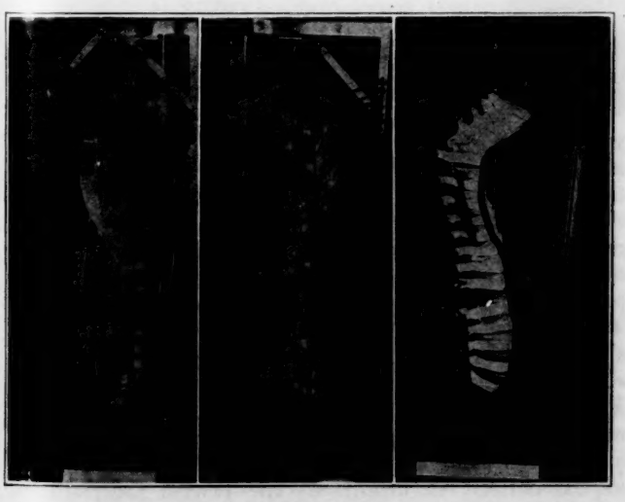
3. The convexity of the laterally deviated spine may be toward either the stronger or the weaker muscle side.

4. The convexity is toward the weak muscle side when the parallel bowstring muscles are dominantly weakened on the side of the convexity of the primary curve of the scoliotic spine.

5. The convexity is toward the strong muscle side when the superficial transverse-traction-torsion muscles are dominantly weakened on the side of the concavity of the scoliosis.

6. There is a definite lateral deviation of the spine with relatively slight rotation of the bodies of the vertebrae when the large superficial muscles of the body are dominantly imbalanced.

7. There is definite rotation or torsion of the spine with relatively slight lateral displacement when the deep intrinsic muscles of the spine are dominantly imbalanced.



Figs. 11 to 13.—Ventral, dorsal and lateral aspects of the dynamic muscle-bone balance model of the human spine (about one-twelfth natural size). This right lateral scoliosis in the dorsal region has a superimposed convex-sided rotation of the bodies of the vertebrae. This deformity is produced by the release of the springs on the right side which represent the right intertransversarii and the right transversospinal muscles of the dorsal region. When the balance of the deep torsion muscles of the spine is upset there is likewise a tendency of imbalanced action of the superficial spinal muscles.

8. In clinical practice there are all combinations of imbalance involving eventually both the superficial and the deep intrinsic muscles of the spine where scoliosis is found.

9. Concave and convex sided rotations of the bodies of the vertebrae are resultants of the imbalance of different groups of muscles of the body as a whole.

10. These facts have been proved experimentally on animals and are demonstrated on the muscle-bone-balance model of the human spine, which visualizes the normal and abnormal dynamic equilibrium of the bilateral body muscles, recorded in the spinal indicator.

11. The problem of scoliosis is, therefore, fundamentally one of prevention of all conditions which upset the normal dynamic balance of muscle and bone during the period of growth, such as chronic inanition and malnutrition, and the various types of chronic diseases, which lead to undernourishment of the growing child.

12. During growth and maturity the components of the motor system of the back differentiate and function as a physiologic, interactive whole and not as a mere mosaic of passive, autonomic and independent anatomic parts. This dynamic point of view is opposed to the static one, which holds that the bone of the spine or any other bone in the body is originated and maintained independent of environment.

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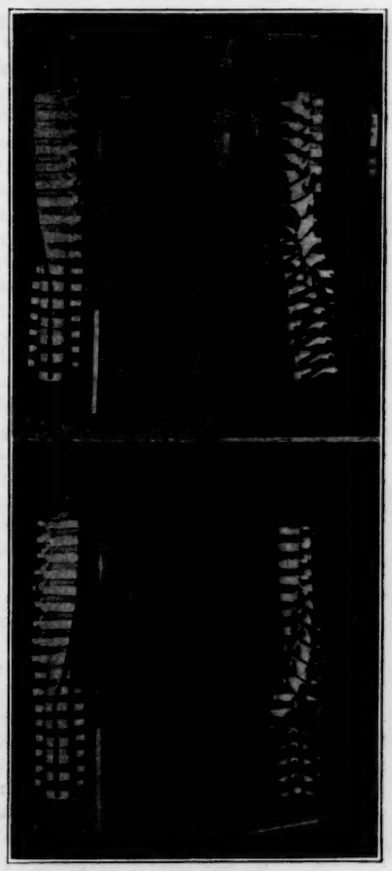

Figs. 14 to 17.—Ventral and dorsal aspects of the dynamic muscle-bone balance model of the human spine (one-twelfth natural size). The springs that represent the superficial muscles acting on the spine are stripped from the model. The intertransversarii and the transversospinal muscles are retained. Marked torsion is produced with relatively little lateral deviation of the spine when there is imbalanced action of these deep torsion muscles. The bodies of the vertebrae rotate to the right when the right transversospinal muscles (springs) are released from action (figs. 14 and 15). The bodies of the vertebrae rotate to the left when the springs that represent the left transversospinal muscles are released from action in the dorsal region (figs. 16 and 17). When the intertransversarii act on one side there is a slight bowstring effect with the convexity of the spine directed to the opposite side.

ABSTRACT OF DISCUSSION

DR. ROBERT B. OSGOOD, Boston: Dr. Carey's muscle-bone balance model and spinal indicator are marvels of ingenuity and accuracy. It is conceivable, though not probable, that some one will study the numerous possible combinations of the thirteen pairs of spinal muscles. This model makes such a study possible. Dr. Carey has suggested that it would be wise to look for the underlying causes of scolioses of unknown etiology in a dystrophy of muscle and bone growth for which undernourishment and malnutrition during the first decade of life may be insidiously responsible. (Baker has shown that this condition exists in 25 per cent of school children.) As Dr. Carey says, the dominant muscular atrophy is focal and asymmetrical. No one who accepts this hypothesis as to etiology can find fault with his first conclusion that "scoliosis is a spinal sign of the imbalance of muscle and bone growth of the motor system of the back and is not a specific disease entity." Proceeding on this hypothesis and by means of his muscle-bone balance model, Dr. Carey has thrown much light

on the puzzling phenomenon of spinal deviation in one child toward the side of the weaker muscles and in another child toward the side of the stronger muscles. The plan which is suggested for the control and prevention of scoliosis is entirely rational but need not alarm orthopedic surgeons as to the immediate disappearance of the deformity. None would be more glad than they to discover simple means of prevention and control. Dr. Carey believes that the problem will be solved only if one can prevent all conditions which upset the normal dynamic balance of muscle and bone during the period of growth. The complexity of the problem may be visualized when one realizes that this includes the prevention of all types of undernourishment and of the many chronic diseases that are associated with malnutrition in the growing child.

DR. ALBERT B. FERGUSON, New York: Dr. Carey's painstaking work emphasizes the need of early recognition and prevention of scoliosis, the possibility of lateral traction muscles producing curves with the muscle weakness on the concavity, and the close relation between increase of curvature and growth, all important points. His model pictures the immediate effect of muscle paralysis and hence is more comparable to the early development of curvature after poliomyelitis than to idiopathic scoliosis. In idiopathic scoliosis the curve may remain in statu quo for some years until adolescence is reached. Then the curve will increase. Similarly, paralysis may cause a curve to a degree at which a position of balance is reached and then fail to increase until the period of rapid growth. This relation to growth has no counterpart in the dynamic model. In scoliosis there is rotation in one direction at one end of the curve and in the opposite direction at the other end. Certainly a rotary curve in one direction, as in the model, must be very rare. Clinically, I have been impressed by the apparently reciprocal relation between rotation and wedging of the vertebral bodies. With a curve of given degree in a given area of the spine, a definite amount of rotation may be expected unless wedging is present. With wedging there will be less rotation. Wedging appears to decrease the need for rotation. Wedging has no counterpart in the model. One may note that, in a case in which a dorsal curve has been completely corrected and fused so that it remains straight, a compensatory lumbar curve with rotation will subsequently become straighter or completely straight, and its rotation will decrease or disappear. Were the rotation due to imbalance of rotator muscles, one would not expect this result, as the imbalance would still be present.

DR. LEMUEL D. SMITH, Milwaukee: There are two considerations of especial importance. Dr. Carey stresses the dynamic concept of spinal mechanics and suggests vertebral rotation as an independent motion. It is important to regard the spine as other than a static organ whose structural limitations govern scoliotic phenomena. In 1844, Dr. Bigelow stated that the principle of torsion rotation is illustrated by bending a blade of grass or a flat flexible stick in the direction of its width. The center rotates on its longitudinal axis to bend flatwise in the direction of its thickness. Likewise the spine laterally flexed turns on its vertical axis, to yield in its shortest or anteroposterior diameter. This statement implies that: 1. There is a continuity of substance in the spine. 2. The spine is flat. 3. The plane of flatness is in the frontal plane. 4. Rotation is a concomitant element of lateral flexion. The bony spinal column is formed by three nearly parallel columns. The anterior column of centra is a compressible but nonextensible structure. This is due to the resilience of the intervertebral disks and the inelasticity of the longitudinal ligaments, further limited by the synarthrotic attachments of its elements which contribute to its rigidity and prevent eccentricity of its elements with respect to their common axis. This is a semirigid structure with a semblance of continuity permitting flexion and torsion in its own axis. The two posterolateral columns of intervertebral arthrodial diarthroses permit free gliding motion of their elements by virtue of the redundance of their capsules. There is no suggestion here of continuity; instead there is a series of universal joints, two couples to each segment. A line connecting the elements of each couple lies in the frontal plane and forms with its apex in the column of centra a narrow base triangle. Any position of the spine, as a whole, is a summation of movements of these triangles about the column of centra as a center of motion, their respective centers of motion being located in the corresponding centra. A cross-section of the spine is not rectangular but triangular with its greater diameter in the anteroposterior plane. The amplitude of motion in any direction is inversely proportional to the distance of the gliding joint from its center of motion. The amplitude is less in sagittal bending than in lateral bending. Any tendency toward rotation is greater in sagittal than in frontal flexion.

DR. F. J. GAENSLEN, Milwaukee: Dr. Carey demonstrated first that in conditions of undernutrition or starvation the growth of an animal in length is not materially different from that of a normal individual. The increase in weight, however, is greatly retarded. The loss, of course, is due largely to a loss in muscle substance. This loss of muscle substance, however, is not symmetrical but asymmetrical, and because of that asymmetrical loss there is an imbalance of the dynamics of the spine. Dr. Carey's term "spinal indicator" seems very apt and picturesque because the indicator can be seen to move in the model from zero, the middle point, to one side or the other, depending on the weakness of the muscle of the two sides. He can foretell just what sort of curve he will produce in his model by releasing certain pulls. On the other hand, one cannot tell when one sees a skeleton of a deformed spine as to what muscle groups were instrumental in the production of that deformity. Neither can one tell from an inspection of the roentgenogram. We orthopedic surgeons prided ourselves, I suppose, heretofore that, given a certain deformity rotation and deviation to the side, we could tell fairly well what muscles were involved, and perhaps we can to a certain extent, especially so far as the superficial muscles are concerned; but when it comes to the deep rotators and the many varieties of combinations which can produce scoliosis, then indeed we must become very modest. The fact that there is this asymmetrical loss of strength in the body during periods of starvation or of undernutrition is, I feel sure, a highly probable explanation of some of the cases which have been called idiopathic scoliosis.

XANTHOMATOSIS

(SCHÜLLER-CHRISTIAN'S DISEASE; LIPOID HISTIOCYTOSIS) *

MERRILL C. SOSMAN, M.D.
BOSTON

Xanthomatosis is a disease of lipoid metabolism in which storage tumors of lipoid appear in various places and in various organs, sometimes profoundly affecting the bodily health and welfare. There are five clinical entities included under this heading; namely, Gaucher's disease, Niemann-Pick's disease, Schüller-Christian's disease, the xanthomas occurring in icterus, diabetes and pregnancy, and the so-called essential xanthomatosis. The first type, Gaucher's disease, involves chiefly the spleen, occurs at any age but most frequently in female children, is familial, and is fairly benign. Niemann-Pick's disease is appropriately called hepatosplenomegaly because of the marked enlargement of the liver and spleen, is racial rather than familial, occurring almost entirely in infants of the Jewish race, and is rapidly fatal. Schüller-Christian's disease occurs chiefly in young children, is characterized by involvement of the bones of the skull, occasionally other bones, with frequent association of diabetes insipidus, exophthalmos and gingivitis, less commonly dwarfism, adiposogenital dystrophy and jaundice, is not racial or familial, and is fatal in about one third of the cases. The other two types are usually cutaneous or mesenchymal deposits of lipoids, frequently in tendons or tendon sheath, with

* From the Department of Roentgenology, Peter Bent Brigham Hospital.
* Read before the Section on Radiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 11, 1931.
* Because of lack of space, this article has been abbreviated in THE JOURNAL by the omission of several case reports and pictures. The complete article appears in the author's reprints.

or without diabetes, jaundice or pregnancy, are not racial or familial, occur usually in adults, and are quite benign.

All these diseases have been prominent in the recent medical literature, especially since Rowland's [1] monumental work conclusively proved that Schüller-Christian's disease belonged in the same category with the other lipoid diseases. The term "xanthomatosis" was coined by Rowland and there is a variety of names proposed for the group and for the members of the group. These will be discussed later. The etiologic factor common to all the members is presumably a disturbance of lipoid metabolism or of lipoid excretion, resulting in the storage of various forms of lipoid in the organs or tissues of the patient, either widespread and diffuse (as in Niemann-Pick's and Gaucher's disease) or localized in granulomatous deposits as in Schüller-Christian's disease and the cutaneous xanthomas. The signs and symptoms resulting from the disease depend on (1) the systemic effect of the disturbance in metabolism and (2) the local effects of the deposits, which may at times assume considerable size. Histopathologic studies have demonstrated that we are not dealing with a neoplasm of any organ or system but with a phagocytic action of the reticulo-endothelial system, which either removes an excess of lipoids from the tissues or stores an excess of lipoids particularly (in Schüller-Christian's disease) in areas in which trauma or infection may have stimulated a collection of histiocytes. Chemical studies, particularly the recent careful and complete work of Epstein and Lorenz,[2] have proved that different lipoids are at fault in the different diseases and have added much to our knowledge of this clinical group. They found that the lipoids in Gaucher's disease were predominantly cerebrosides, chiefly kerasin; in Niemann-Pick's disease the phosphatides were in excess, chiefly lecithin, and in Schüller-Christian's disease cholesterol and its esters were predominant. In xanthomas and essential xanthomatosis (not considered in their publication) a complex group of lipoids is found, of variable percentage, usually in part, at least, cholesterol and its esters. In all probability a sixth disease entity belongs in this group, quite similar histopathologically to (if not identical with) Niemann-Pick's disease, and that is amaurotic familial idiocy (Tay-Sachs).[3] Chemical analyses on the tissues from one of these cases have been made and a report will be forthcoming from Epstein and Lorenz.

The present paper concerns in general the cholesterol disease of Schüller-Christian, its manifestations, its natural course, and in particular the effect of roentgen treatment on the local deposits and on the signs and symptoms of systemic disturbance. To that end I shall review three cases that I have reported previously and bring them down to date, review and bring down to date one case reported by Christian in 1919, and report two new cases.

REPORT OF CASES

The first three cases have been previously reported.[4]

CASE 1.—R. M., a boy, aged 4½ years, was first seen, March 1, 1928, because of swelling of the right forehead and prominence of the right eye.

The family and past histories were unessential except that the patient had failed to gain in weight or stature for the past year.

The present illness began six months before admission when, following a fall, with injury to the right forehead, a lump formed at the point of injury. A month later the right eye became prominent.

The physical examination was negative except for a palpable defect in the right frontal bone and a moderate exophthalmos of the right eye. The boy was well developed and well nourished but somewhat irritable. Roentgenograms of the skull (fig. 1) revealed several large, irregular defects in the right frontal bone, the largest one measuring 5 by 5 cm. There was partial destruction of the roof of the right orbit, and a smaller area of clean-cut destruction in the anterior portion of the left parietal bone. Roentgen treatments were given, two doses, each one-third erythema dose, March 5 and March 8, to the right frontal area. Examinations six weeks and three months later showed definite healing of the bone in the right frontal region, but the untreated lesion in the left parietal bone had grown larger. An attempt was made to duplicate Rowland's success in his case 2 by placing the boy on a low fat diet, but after six weeks of a carefully controlled low fat diet a new lesion was found in the posterior portion of the left parietal bone, which, after six more weeks of low fat diet, had definitely increased in size. The lesion in the right frontal bone, which had entirely healed (fig. 2), recurred; the exophthalmos increased slightly and there was a slight polydipsia and polyuria. Insulin, 5 units twice a day, was then tried. This improved the boy's appetite with a consequent gain in weight, but the defects grew larger. A second series of roentgen treatments (details are given in a previous report) resulted in prompt healing of the frontal defect while the posterior parietal defect continued to grow. In addition, a new defect was found in the left ilium, and this in turn healed promptly after roentgen treatment with a two-thirds erythema dose. Finally the posterior parietal defect, which had progressively grown larger through a long period of low-fat diet and insulin treatment, was irradiated and it promptly healed, having completely disappeared in four months. At this time, small defects had appeared in each femur, in the right humerus and in the right ilium. The one in the left ilium remained healed.

Our next step was to try feeding desiccated thyroid gland, one-half grain (0.03 Gm.) a day. This resulted in an increase

Fig. 1 (case 1).—Skull before roentgen therapy, showing defects in the bones.

Fig. 2 (case 1).—Skull six months after roentgen therapy, showing healing of defects.

1. Rowland, R. S.: Xanthomatosis and the Reticulo-Endothelial System, Arch. Int. Med. **42**: 611 (Nov.) 1928.

2. Epstein, Emil; and Lorenz, Karl: Die Phosphatidzellverfettung der Milz bei Niemann-Pickscher Krankheit verglichen mit der Lipoidchemie des Morbus Gaucher und der Schüller-Christianschen Krankheit, Ztschr. f. physiol. Chem. **192**: 145, 1930.

3. Goldstein, Isadore; and Wexler, David: Niemann-Pick's Disease with Cherry-Red Spots in the Macula, Arch. Ophth. **5**: 704 (May) 1931. Hassin, G. B.: Niemann-Pick's Disease (Pathologic Studies of a Case), Arch. Neurol. & Psychiat. **24**: 61 (July) 1930. Kufs, H.: Are Amaurotic Familial Idiocy (Tay-Sachs) and Splenohepatomegaly (Niemann-Pick) Identical in Their Pathogenesis? Arch. f. Psychiat. **91**: 101, 1930. Schaffer, Charles: Pathogenesis of Amaurotic Idiocy, Arch. Neurol. & Psychiat. **24**: 765 (Oct.) 1930.

4. Sosman, M. C.: Xanthomatosis (Schüller's Disease; Christian's Syndrome): Report of Three Cases Treated with Roentgen Rays, Am. J. Roentgenol. **23**: 581 (June) 1930.

in appetite and improvement in general well being, but a loss of weight and increased irritability.

Reexamination six weeks later showed partial healing of the defects in the long bones, which were completely healed in another two months, but in the meantime a new defect had appeared in the supra-orbital area on the right. In addition, a reddened tender swelling appeared in the right lower eyelid. This was thought to be an infected meibomian cyst and it was opened and drained, yellowish firm masses being evacuated. Histologic study of this tissue showed numerous fat-laden macrophages and giant cells, and the diagnosis was "xanthomatosis" (Verhoeff), "lipoid histiocytosis" (Wolbach).

Since that time the boy has had several more roentgen treatments to various areas, as indicated by the appearance of defects. When last seen, June 9, 1931, he was in good condition; red blood cells, 4,120,000; hemoglobin, 76 per cent (Sahli); white blood cells, 7,400; polymorphonuclears, 64 per cent; eosinophils, 3 per cent; basophils, 0 per cent; small leukocytes, 23 per cent; large leukocytes, 3 per cent; mononuclears, 7 per cent. The blood cholesterol was 131.7 mg. per

Fig. 6 (case 3).—Patient on admission.

Fig. 7 (case 3).—Patient ten months after roentgen therapy.

hundred cubic centimeters. The patient's height was 49½ inches (126 cm.); weight, 56 pounds (25.4 Kg.). A few defects were present in the skull and mandibles but they had not increased or decreased in the past six months.

COMMENT

It is obvious from the preceding reports that there may be considerable variety in the signs and symptoms presented in any given case, and it should be emphasized that no one of the triad reported by Christian (defects in the membranous bones, diabetes insipidus and exophthalmos) is essential to the diagnosis of this disease. Neither are the gingivitis and stomatitis, which are so common early in the disease, nor the adiposogenital dystrophy, stressed by Schüller, essential. The hypercholesterolemia is frequently not found, as explained by Rowland, and even the typical fat-laden xanthoma cells (foam cells, schaumzelle) may be absent in histologic specimens, as the end-result of the process is a nonspecific fibrosis with fibroblasts and giant cells. This would in all probability be the case if a biopsy should be done in the healing stage following roentgen treatment, as happened in a case seen at the weekly x-ray seminar of the Massachusetts General Hospital. This case was clinically and roentgenologically fairly typical, the response to x-rays quite characteristic, and yet the biopsy, done after roentgen treatments were begun, showed only a chronic inflammatory process without the specific characteristic fat-laden histiocytes. Any combination of the signs and symptoms is therefore possible, and any chronological order of appearance of given signs or symptoms is also possible, as will be readily appreciated by considering the nature of the disease. A variation in this chronological sequence led Hand [7] to doubt the "dyspituitarism" thought to be the essential factor by Schüller and Christian. Trauma or infection is not necessary as a predisposing factor, as some authors suppose, several patients closely questioned failing to show these as antecedents. All these signs, plus dwarfism, as reported by Höfer [8] and others, depend therefore entirely on the location of the lipoid granulomas (e. g., exophthalmos indicates deposits in the orbit or destruction of the orbital wall or both, diabetes insipidus indicates involvement of the region of the tuber cinereum or the posterior lobe of the hypophysis, or both, and so on) and the signs, per se, are sufficient justification for roentgen treatments to the involved area. We, as roentgenologists, are chiefly concerned with the defects in the cranial bones as a criterion leading to the correct diagnosis, but in any patient presenting any of the cardinal signs or symptoms previously noted, this disease should be considered and proper steps taken to rule it out or to confirm it. Broadly speaking, this disease concerns many specialties, as witnessed by the variety of publications in which cases appear and by the varied interests of the authors reporting the cases. Cases have been studied and reported by a general practitioner, roentgenologists, internists, a pediatrician, physiologic chemists, ophthalmologists, a dermatologist, a neurologist, a neurosurgeon and, above all, pathologists. Unfortunately, the latter group reported nearly all fatal cases, and I believe that many of the deaths could have been prevented if the disease had been recognized earlier and proper therapy instituted.

TREATMENT

A. *Spontaneous Remissions.*—It has already been shown that this disease is liable to spontaneous remissions (case 6, Schüller's cases,[9] Höfer,[8] and others) so that the effect of any given therapy must be judged with this possibility in mind.

B. *Diet.*—Rowland's patient 2 showed marked improvement after being put on a low-fat diet, but Rowland complicated the picture by feeding thyroid and pituitary lobe extract. None of the other cases reported have been tried on this diet as far as I can determine. Case 2 in this series is the only one of our five in which it was tried that showed any benefit definitely attributable to this theoretically correct mode of therapy, and as opposed to this, cases 1 and 3 showed definite activity of the disease (recurrent or new lesions) while on such a diet. Several authors have doubted the importance of excess fat either in the diet or in the blood as an etiologic factor, notably Wile,[10] but on the other hand

7. Hand, A.: Defects of Membranous Bones, Exophthalmos and Polyuria in Childhood: Is It Dyspituitarism? Am. J. M. Sc. **162**: 509 (Oct.) 1921 (second case).

8. Höfer, Karl: Beitrag zur Xanthomatose der Dura Mater und der Schädelknochen, Klin. Wchnschr. **9**: 1302 (July 12) 1930.

9. Schüller, A., and Chiari, H.: Ein Fall von Xanthomatose, Wien. klin. Wchnschr. **43**: 153 (Jan. 30) 1930 (fourth case by Schüller).

10. Eckstein, H. C., and Wile, U. J.: Lipid Studies in Xanthoma, J. Biol. Chem. **87**: 31 (June) 1930.

frequent reports of high cholesterol values in the blood of these patients are too striking to be disregarded.[11] Lesions quite similar to those of this group have been produced experimentally in animals by means of diets rich in fats or any one of the lipids, such as cholesterol. Fontana[12] was able to produce a splenomegaly similar to that seen in Niemann-Pick's disease by feeding viosterol in large quantities. He suggests that the disease produced be classed as a vitamin excess disease "hypervitaminosis D," as the condition opposite to the vitamin deficiency diseases. Chalatow[13] produced deposits of anisotropic fat in the aortas of goats and found the males were much more easily affected than were the females. He could not find various stages of deposit and concluded that the deposits were made all at once as in a shower ("sprungartiga"), which suggests the presence of a threshold value beyond which the substances are foreign to the host. In short, all the evidence points to an abnormal level or an abnormal threshold of the lipoids, and any attempt to reduce the intake of substances already in excess in the body should be encouraged.

C. *Endocrine Effect.*—A third method of therapy is the giving of endocrine glands or their extracts in the hope of changing the metabolism of fats. Solution of pituitary was first suggested because of the diabetes insipidus, but case 6, in which solution of pituitary was administered more or less constantly for six months, showed no improvement clinically or by roentgen examination at the end of the six months. All reports agree, however, that the diabetes insipidus can be controlled by solution of pituitary, either by injection subcutaneously or by nasal spray.

Occasional cases are reported in which there is decided clinical improvement, probably the result of sleep and rest during the temporary inhibition of the polyuria and polydipsia. Thyroid gland as used in Rowland's case 2 was tried by us in case 1, without other complicating factors. We thought that the problem of therapy had been solved when we discovered that the defects in the long bones were healing coincidentally with the feeding of desiccated thyroid gland, but our enthusiasm was dampened when new lesions appeared in spite of continued feeding of desiccated thyroid. Irradiated foods, parathyroid gland extract, heliotherapy, cod liver oil and high calcium diet have all been tried without definite benefit. Insulin, however, is of definite benefit to the patient, particularly the malnourished one, in that it increases his appetite and thus tends to add weight and strength, and it seems to combat the secondary anemia present in some cases. We used it in doses of 10 units a day in case 1, with definite improvement in the general health, but with no effect on the bone defects, which at times enlarged during the insulin therapy.

It should be noted that Hunt[14] and Chamberlain[15] independently came to the conclusion that insulin did not act specifically in lowering the hypercholesterolemia in diabetes. The latter found experimentally that insulin caused a decrease in the cholesterol content of the suprarenals but not of the liver or spleen. If hypoglycemia was prevented, the decrease was lessened or abolished. He thinks that the suprarenals are important in the synthesis of cholesterol, that the liver is the organ in which it is destroyed and that the spleen is simply a storehouse. He also found that dried thyroid extract fed by mouth had no appreciable effect on the blood cholesterol, although with excess thyroid feeding in animals the suprarenals did not decrease in weight proportionately with the other organs and tissues. Mason, Hunt and Hurxthal,[16] however, found a low blood cholesterol in the cases of hyperthyroidism at the Lahey Clinic, and this led us to try thyroid feeding in our cases. Chamberlain also found that injection of anterior lobe pituitary extract had no effect on the blood cholesterol. It is indeed a complicated situation, but there are many other things yet to be tried and we hold in reserve roentgen therapy, which has not failed us as yet.

Fig. 8 (case 4).—Skull showing multiple defects.

Fig. 9 (case 4).—Skull showing healing of defects five months after roentgen therapy.

D. *Roentgen Therapy.*—Roentgen treatments have given a uniformly beneficial result as far as the local deposits in the bones are concerned, and the effect seems to be local and specific as shown in cases 1, 2, 3, 4 and 5. Apparently the recuperative powers of youth are important, for in case 2 the healing was quite slow, although definite, while the symptomatic response was unusually prompt and efficient. Obviously the bone matrix has not been destroyed in these cases because the healed area is eventually indistinguishable from the surrounding areas, with no line of demarcation or transition to divide the uninvolved from the newly healed areas. It is noted with striking frequency that in the report of cases the descriptions say "There is no inflammatory reaction at the edge of the defects." In case 4, however, the area surgically explored in the scapula has not filled in with new bone, suggesting that the framework necessary for the healing was removed or destroyed. Probably the same condition would exist if infection or other insult was added to the area of

11. A. M. Gaál (Cholesterol Metabolism in Essential Xanthomatoses, Ztschr. f. klin. Med. **113**: 349, 1930) reports a case of essential xanthomatosis with a blood cholesterol of 650 mg. per hundred cubic centimeters. On a low cholesterol diet the xanthomas disappeared and the blood cholesterol value fell to 170 mg. per hundred cubic centimeters. On return to normal diet the hypercholesterolemia and the xanthomas slowly recurred.

12. Pérez Fontana, V.; Munilla, A., and Collazo, J. A.: Histiocitosis lipoidica esencial (tipo Niemann-Pick) del bazo, por grandes dosis de ergoesterina irradiada, An. de Fac. de med., Montevideo **14**: 1075 (Aug.) 1929.

13. Chalatow, S. S.: Experimental Cholesterolsteatosis, Virchows Arch. f. path. Anat. **272**: 691, 1929.

14. Hunt, H. M.: Cholesterol in Blood of Diabetics Treated at the New England Deaconess Hospital, New England J. Med. **201**: 659 (Oct. 3) 1929.

15. Chamberlain, E. N.: The Effects of Insulin and Other Endocrine Extracts on the Cholesterol Content of Tissues, J. Physiol. **70**: 441 (Dec.) 1930.

16. Mason, R. L.; Hunt, H. M., and Hurxthal, L. M.: Blood Cholesterol Values in Hyperthyroidism and Hypothyroidism—Their Significance, New England J. Med. **203**: 1273 (Dec. 25) 1930.

involvement, as in Höfer's case, in which there was definite thickening of the bone ("marmorartige") in some of the healed areas.

The good results of roentgen treatments have been reported, independently, by Gilmore,[17] Cignolini,[18] Vampré,[19] Schüller,[9] Rothnem [20] and myself.[4] Gilmore, however, reported his case as "multiple myeloma syndrome," as have, in fact, many other authors. Cignolini first used roentgen therapy in June, 1928, on a 14 year old patient with defects in many bones, diabetes insipidus, malnourishment, underdevelopment and marked gingivitis. There was no exophthalmos. The disease began twelve years before with diabetes insipidus and had been treated with parathyroid extract, calcium and solution of pituitary. The bones involved were the cranial vault, ilia, femur, ribs and mandibles. The finding of cystic areas in the mandibles when the patient was sent to Cignolini because of the loss of his teeth led to the taking of roentgenograms of the skeleton and eventually to the correct diagnosis. The results of his therapy were striking, the defects healing promptly with almost complete restoration of normal structure, as in our cases. This was accomplished with half an erythema dose repeated at one and three months. More striking was the prompt disappearance of the gingivitis and stomatitis with a restoration of normal stability in teeth that were almost falling out. Here he used half an erythema dose to each jaw, three days apart, which was repeated the following month. Improvement was evident in three weeks. Still more striking was the effect on the diabetes insipidus when the pituitary region was "timidly" treated with from one-fifth to one-fourth erythema dose. The patient was consuming from 6 to 7 liters daily, even with frequent injections of solution of pituitary, and from 10 to 12 liters a day without the solution of pituitary. After radiation therapy the intake dropped to from 1.5 to 2.5 liters a day without solution of pituitary. Similarly the patient's stature increased 8 cm. in a few months and puberty came on suddenly after the irradiations had been given.

Fig. 10 (case 5).—Patient on admission, showing marked exophthalmos.

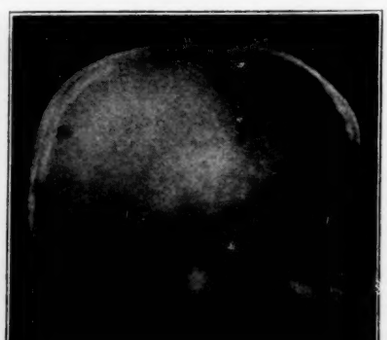

Fig. 11 (case 5).—Skull showing "map-like" areas of bone destruction.

Vampré first treated his patient with high voltage roentgen irradiations to the pituitary region in November, 1929. His patient was a boy, aged 15, seen eleven years before, when a diagnosis of "chloroma" was made. Exophthalmos, defects in the cranial bones, polyuria (up to 25 liters in twenty-four hours), loss of weight, enlarged glands and hypogenitalism were all present. Following the irradiations he reports increased growth, diminution of polyuria to from 6 to 7 liters a day and normal sexual development, but no diminution of the exophthalmos. No mention was made of the effect of the treatments on the bone defects, but he noted a marked general improvement and hoped for complete restoration to normal.

Schüller and Chiari's patient was a man, aged 26, who had adiposogenital dystrophy, brain tumor symptoms (headaches, nausea, vomiting, choked disks and a positive Babinski reflex), defects in the skull, right exophthalmos, polyuria and daily fever up to 39 C. (102.2 F.). After roentgen therapy in May, 1929, the patient's condition improved and he was discharged from the hospital. Reexamination five months later showed a decrease in the size of the defects and a loss of sharp outline, but the patient went rapidly down hill and died. The details and dates of the treatments were not given either by Schüller and Chiari [9] or by Chiari,[21] who reported the subsequent autopsy in detail, the patient dying with symptoms of cardiac insufficiency.

Rothnem [20] reports the case of a boy, aged 2 years, with defects in the skull, scapula, ribs, humerus and femur, and marked eczema. Biopsy was done twice, and five pathologists gave various reports, four diagnosing "infectious process" and the fifth "giant cell tumor." The case was clinically and roentgenologically quite typical, and under roentgen therapy the eczema healed and the defects began to heal. The patient died suddenly nine months after roentgen treatments. Autopsy was not permitted. The details of roentgen therapy were not given.

Cohen, Moreau and Murdoch [22] noted the efficacy of roentgen therapy in the healing of defects in the bones but did not use it in their patient.

Our first roentgen treatments were given in March, 1928, in case 1 and have been used in the four subsequent cases, three of which were in the Children's Hospital of Boston. Dr. Vogt used moderate voltage and filtration in the three cases, at first giving the maximum suberythema doses but later decreasing his doses to subepilating quantities with apparently equal benefit. Our treatments were given with 185 kilovolts, 40 cm. focal skin distance, 0.5 mm. rolled copper filter and 200 milliampere minutes. This was 85 per cent of our maximum suberythema dose and totaled 646 r, as measured by the Duane ionization chamber in air. Later we decreased this dose to 160 milliampere minutes (507 r), which did not cause epilation but resulted in healing of the defects although not as promptly as after the larger doses. Usually we divided these total doses into equal parts, giving them from two to seven days apart. From our observations, it would seem that the type and amount of roentgen therapy are not important but should depend on the location of the lesion to be treated. For the fairly superficial defects in the skull,

17. Gilmore, M. E.: Multiple Myeloma Syndrome in a Child, Texas State J. Med. **21**: 358 (Oct.) 1925.
18. Cignolini, P.: Effetti locali e generali della radioterapia in un caso di diabete insipido associato ad osteopatia, Radiol. med. **16**: 16 (Jan.) 1929.
19. Vampré, E.: Syndrome de Christian, Rev. sud-am. de méd. et. de chir. **1**: 459 (May) 1930.
20. Rothnem, T. P.: Defects in Membranous Bones, Exophthalmos and Diabetes Insipidus (Christian's Syndrome), Radiology **15**: 694 (Dec.) 1930.
21. Chiari, H.: Die generalisierte Xanthomatose vom Typus Schüller-Christian, Ergebn. d. Path. u. Anat. **24**: 396, 1931.
22. Cohen, Moreau and Murdoch: La dysostose hypophysaire (maladie de Schüller, syndrome de Christian) xanthomatose des os du crâne, Rev. d'orthop. **17**: 714 (Nov.) 1930.

or for the enlarged glands in the neck, axilla or groins, a moderate voltage and filtration, with not more than from one-half to two-thirds erythema dose seem to be sufficient. For the lesions in or around the pituitary gland, in the lungs and in the pelvic bones, a higher voltage, greater filtration and a larger surface dose may be necessary.

Both local effects and general systemic effects as well as secondary effects on hypophyseal function have been definitely established already, but the mode of action remains unknown. There is a considerable literature on the effect of roentgen therapy on the reticulo-endothelial system, chiefly experimental,[23] but the results are at variance. Presumably the irradiation kills the already distended and fat-laden histiocytes, liberating the lipoids, which are disposed of elsewhere, and allowing the individual lesion to heal by the normal course. In lesions involving the pituitary gland it is evident that the gland is not destroyed but is only temporarily out of commission, on account either of invasion by the xanthoma cells or of pressure by the granulomatous masses on the gland. The exophthalmos is the most stubborn in yielding to treatment, as it is in other conditions, such as exophthalmic goiter. The danger of inhibiting the normal function of the pituitary gland is remote, as we repeatedly irradiate this area with full doses in patients with suprasellar or third ventricle tumors and with no deleterious effects on the function of the gland. Likewise, we have been unable to damage the pituitary gland or the surrounding brain in dogs with surface doses five times as large as those used in human subjects.

Beneficial results from roentgen therapy have been reported in cases of nodular xanthomas and in xanthoma diabeticorum. We have had no success in the roentgen treatment of the enlarged spleen in Gaucher's disease, and we have not had the opportunity to try roentgen therapy in a case of Niemann-Pick's disease. In view of the striking improvement in the Schüller-Christian type of lipoidosis it would certainly be advisable to try it in the otherwise invariably fatal Niemann-Pick type.

STATISTICAL AND HISTORICAL

Rowland[1] was able to collect reports of twelve cases of Schüller-Christian's disease in 1928 and added two of his own. In a paper in 1930 I[4] collected reports of six additional cases and added three new cases. This year (1931) I have been able to collect forty-three cases and have added two new cases, making a total of forty-five in the literature to date. As always, there are many other cases either lost under misleading titles or recognized but not reported. In the latter group, for instance, I know of six additional cases which have not been reported.

The first to report this disease was Hand[24] in 1893, who attributed the syndrome to tuberculosis, even after autopsy and histologic studies. Kay[25] was second with a case reported in 1905 under the title "Acquired Hydrocephalus with Atrophic Bone Changes, Exophthalmos and Polyuria." Pusey and Johnstone[26] reported the third case in 1908 as a case of xanthoma approaching the diabetic type with diabetes insipidus. Fourth came Dietrich[27] in 1913, then Schüller[28] in 1915 with two cases, and Christian[6] in 1919. None of these early authors suspected the real cause of the disease, and it remained for Rowland[1] in 1928 to discover the underlying metabolic defect and to explain the local deposits. For convenience, I have listed the references to cases which I consider as belonging to this group of lipoidoses, arranged in chronological order.[29]

As already noted, many of these cases are indexed under titles or names which would now be considered incorrect, and there are probably other cases which I have been unable to locate. The names for this condition, even when recognized, are many and varied, and the proper and correct terminology is still a subject for debate. Chester,[30] for instance, objects to the names "Schüller's disease" and "Christian's syndrome" as being contrary to the rules of priority, and uses the term "Hand's disease" on that basis. He prefers, however, to call it "lipoid granulomatosis," indicating the etiology and the histologic condition. Wolbach[31]

Fig. 12 (case 6).—Patient on admission.

Fig. 13 (case 6).—Patient twelve years later; still moderate exophthalmos present.

23. Pohle, E. A.: The Effect of Roentgen Rays on the Reticulo-Endothelial System, Am. J. Roentgenol. **22**: 439 (Nov.) 1929.

24. Hand, A.: Polyuria and Tuberculosis, Arch. Pediat. **10**: 673, 1893.

25. Kay, T. W.: Acquired Hydrocephalus with Atrophic Bone Changes, Exophthalmos and Polyuria (with Presentation of Patient), Pennsylvania M. J. **9**: 520, 1905-1906.

26. Pusey, W. A., and Johnstone, O. P.: A Case of Xanthoma Diabeticorum and Lipoma Multiplex and a Case of Xanthoma Approaching the Diabetic Type with Diabetes Insipidus, J. Cutan. Dis. incl. Syph. **26**: 552, 1908.

27. Dietrich, A.: Ueber ein Fibroxanthosarkom mit eigenartiger Ausbreitung und über eine Vena Cava supra sinistra bei dem gleichen Fall, Virchows Arch. f. path. Anat. **212**: 119, 1913.

28. Schüller, A.: Ueber eigenartige Schädeldefekte im Jugendalter, Fortschr. a. d. Geb. d. Röntgenstrahlen. **23**: 12, 1915-1916.

29. Hand, 1893 (footnote 24). Kay, 1905 (footnote 25). Pusey and Johnstone, 1908 (footnote 26). Dietrich, 1913 (footnote 27). Schüller, 1915, two cases (footnote 28). Christian, 1919 (footnote 6). Hand, 1921, second case (footnote 7). Spillman, L., and Watrin, J.: Contribution à l'étude du xanthome papuleux généralisé, Paris méd. **10**: 193 (March 6) 1920. Griffith, J. P. C.: Xanthoma Tuberosum, with Early Jaundice and Diabetes Insipidus, Arch. Pediat. **39**: 297 (May) 1922. Grosh, L. C., and Stifel, J. L.: Defects in Membranous Bones: Diabetes Insipidus and Exophthalmos, Arch. Int. Med. **31**: 76 (Jan.) 1923. Berkheiser, E. J.: Multiple Myelomas of Children, Arch. Surg. **8**: 853 (May) 1924. Schultz, A.; Wermbter, F., and Puhl, H.: Eigentümliche granulomartige Systemerkrankung des hämatopoetischen Apparates, Virchows Arch. f. path. Anat. **252**: 519, 1924. Alberti, O.: Radiol med. **11**: 517, 1924. Schoen, R.: Deforming Osteitis with Diabetes Insipidus, München. med. Wchnschr. **71**: 1713 (Dec. 5) 1924. Thompson, C. Q.; Keegan, J. J., and Dunn, A. D.: Defects of Membranous Bones, Exophthalmos and Diabetes Insipidus, Arch. Int. Med. **36**: 650 (Nov.) 1925. Turner, A. L.; Davidson, J., and White, A. C.: Xanthomatosis: Some Aspects of Its Blood Chemistry and Pathology, Edinburgh M. J. **32**: 153 (April) 1925. Gilmore, 1925 (footnote 17). Schüller, A.: Dysostosis Hypophysaria, Brit. J. Radiol. **31**: 156 (April) 1926 (third case). Denzer, B. S.: Defects in the Membranous Bones, Diabetes Insipidus and Exophthalmos, Am. J. Dis. Child. **31**: 480 (April) 1926. Kyrklund, R.: Beitrag zu einem seltenen Symptomkomplex (Schädelerweichungen, Exophthalmus, Dystrophia adiposogenitalis, Diabetes insipidus), Ztschr. f. Kinderh. **41**: 56, 1926. Heard, J. D.; Schumacher, F. L., and Gordon, W. B.: Association of Diabetes Insipidus with Osteitis Fibrosa Polycystica, Am. J. M. Sc. **171**: 38 (Jan.) 1926. Stowe, W. R.: Case of Diabetes Insipidus Associated with Defects in the Skull, M. J. Australia (supp. 5), p. 144, Sept. 10, 1927. Rowland, 1928, two cases (footnote 1). Herzenberg, 1928, two cases (footnote 34). Globig, Hans: Ueber eine eigenartige Knochenerkrankung mit multipler Tumorbildung im Skelettsystem bei einem Kinde, Jahrb. f. Kinderh. **125**: 90 (Sept.) 1929. Cignolini, 1929 (footnote 18). Hausman, Louis; and Bromberg, Walter: Diabetic Exophthalmic Dysostosis, Arch. Neurol. & Psychiat. **21**: 1402 (June) 1929. Pickhan and Joel, 1929 (footnote 33). Sosman, 1930, three cases (footnote 4). Sophian, Abraham: Diabetes Insipidus and Osteitis Fibrosa Polycystica, J. A. M. A. **95**: 483 (Aug. 16) 1930. Schüller and Chiari, 1930, fourth case (footnote 9). Höfer, 1930 (footnote 8). Vampré, 1930 (footnote 19). Cohen, Moreau and Murdoch, 1930 (footnote 22). Rothnem, 1930 (footnote 20). Henschen, F.: Fall von Xanthomatose mit Knochenveränderungen und grosszelliger Splenomegalie, Centralbl. f. allg. Path. u. path. Anat. **50**: 44, 1930. Chester, 1930, two cases (footnote 30). Sosman, in this article, two cases.

30. Chester, William: Ueber Lipoidgranulomatose, Virchows Arch. f. path. Anat. **279**: 561, 1930.

31. Wolbach: Personal communication to the author.

objects to Rowland's name of "xanthomatosis" as being only descriptive and not accurate, leading to confusion with other clinical entities now classed under that heading. Wolbach suggests "lipoid histiocytosis," the term first used by Bloom in 1925 for Niemann-Pick's disease, as being etiologically and histologically preferable. Verhoeff [32] in turn objects to that name, saying that it has not yet been proved beyond a reasonable doubt that the xanthoma cells are histiocytes, and he prefers Rowland's term "xanthomatosis." Epstein and Lorenz,[2] on the basis of their chemical analyses, suggest the generic term "lipoidosis" for the whole group with the qualifying terms "cholesterol type of Schüller-Christian," "phosphatide type of Niemann-Pick" and "cerebroside type of Gaucher" for the individual members. According to their ideas, amaurotic familial idiocy will join this group as soon as the offending lipoid is identified, and will be given the eponymic designation of "Tay-Sachs type." Schüller accepts Rowland's "xanthomatosis," which has the justification that Rowland was the first one to describe the disease correctly as far as etiology was concerned. It might justly be called "Rowland's disease" for that reason. However undesirable eponymic designations may be, common usage so far is in favor of "Schüller-Christian's disease" and as such it is accepted by the *Quarterly Cumulative Index Medicus*. Chiari [21] combines these factors and calls it "the generalized xanthomatosis of the Schüller-Christian type." Others such as Pickhan and Joel,[33] go back to Schüller's original description and call it "landkartenschädel" (maplike or geographic skull), a name which is obviously unsuited to the many manifestations of the disease. Herzenberg [34] attempted to classify this syndrome as "a skeletal form of Niemann-Pick's disease," to which Pick [35] objected, differentiating it on various grounds. Many other authors simply report the syndrome under one or more of the prominent signs or symptoms, a proceeding which is now unjustifiable.

As the disease entity is not constant in its manifestations and as combinations of the various types have been reported, it would seem best to designate the group as lipoidosis, with a supplementary designation indicating the specific type or types under consideration, and for this I see no objection to complying with common usage and accepting the eponymic terms already given. Thus the proper name for the syndrome under discussion in this paper would be "lipoidosis, Schüller-Christian type." As previously noted, combinations of the various types have been reported but are not above suspicion. Herzenberg's cases of skeletal involvement due to Niemann-Pick's disease probably belong entirely in the Schüller-Christian group. Several cases, however, of combined Niemann-Pick and Tay-Sachs types have been reported. Sobotka, Epstein and Lichtenstein's [36] cases are examples. Even these are not above suspicion. Cutaneous xanthoma and xanthelasma are noted in several cases of the various types.

Of particular interest as being a variant of the usual Schüller-Christian syndrome are the two cases reported by Chester in which he found lipoid granulomas in the long bones of two patients, one of whom had xanthelasma on the eyelids. Both were adults and neither case was diagnosed before autopsy. They differ because of the dense osteoplastic reaction involving both the medulla and the spongiosa of the bones demonstrable on roentgenograms (post mortem) as dense structureless areas. The lungs were diffusely involved in one case, with hypertrophy and dilatation of the right heart. Only a few of the typical Schüller-Christian cases have shown this type of reaction, Höfer [8] and Slauck and Donalies [37] being the only ones noting increased density in the bones as shown by roentgen examination. Wassiljeff [38] reports a widespread infiltration of the bones, lungs, and other structures in his case, with osteosclerosis but no defects. The cells were similar to those seen in Gaucher's disease and were vacuolated, but he was unable to identify fat within the cells. Our patient 6 showed definite thickening of the base of the skull when reexamined fifteen years after the onset of the disease. There was no such reaction in the other cases in the areas which healed after irradiation.

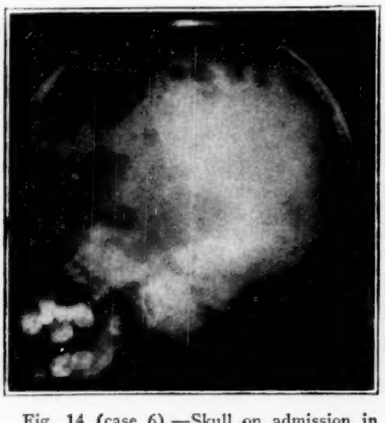

Fig. 14 (case 6).—Skull on admission in 1918.

Fig. 15 (case 6).—Skull in 1930 after spontaneous healing of the defects.

SUMMARY

1. Xanthomatosis (lipoidosis, Schüller-Christian type) is due to a disturbance of lipoid metabolism and is characterized by deposits of lipoids, chiefly cholesterol and its esters, in various organs and tissues in the body.

2. The signs and symptoms depend on the location and extent of these deposits. Chief among them are defects in the bones, exophthalmos, diabetes insipidus, gingivitis, cessation of growth, and occasionally adiposogenital dystrophy.

3. Treatment has been ineffectual with the exception of roentgen therapy to the areas of lipoid deposit, which has uniformly resulted in prompt healing changes. The improvement has been most marked as regards the disappearance of the defects in the bones, least marked as regards the exophthalmos. The change in general or systemic signs and symptoms depends on the areas treated and not on the quantity or quality of the therapy given.

32. Verhoeff: Personal communication to the author.
33. Pickhan, A., and Joel, W.: Zur Frage des sogenannten Landkartenschädels, Röntgenpraxis **1:** 791 (Nov. 1) 1929.
34. Herzenberg, Helene: Die Skeletform der Niemann-Pickschen Erkrankung, Virchows Arch. f. path. Anat. **269:** 614, 1928 (comment by Lubarsch, p. 823).
35. Pick, L.: Discussion, Virchows Arch. f. path. Anat. **274:** 152, 1930.
36. Sobotka, Harry; Epstein, E. Z., and Lichtenstein, Louis: The Distribution of Lipoid in a Case of Niemann-Pick's Disease Associated with Amaurotic Familial Idiocy, Arch. Path. **10:** 677 (Nov.) 1930.
37. Slauck, A., and Donalies, H.: Beitrag zur Kenntnis der Ostitis fibrosa, Med. Klin. **26:** 463 (March 28) 1930.
38. Wassiljeff, A. A.: A Peculiar Form of Systemic Disease of Marrow with Osteosclerosis, Virchows Arch. f. path. Anat. **271:** 134, 1929.

4. Six cases are reported, two of them being new cases, making a total of forty-five now available in the literature.

721 Huntington Avenue.

ABSTRACT OF DISCUSSION

DR. ARTHUR C. CHRISTIE, Washington, D. C.: I wish to emphasize two points. One of them is the diagnosis of the disease, which depends entirely on the roentgen examination. As Dr. Sosman pointed out, the symptoms that attend the disease, such as exophthalmos, diabetes insipidus and gingivitis, are all incidental to it. That is, they are practically accidents. They are determined by the localities that happen to be involved at the time; diabetes insipidus, if the pituitary region is involved, exophthalmos if the roofs of the orbits happen to be involved and gingivitis if the disease involves the mouth. Diagnosis of the disease really depends on finding these clear-cut, destructive areas in the bones, especially in the skull. Dr. Sosman completed the picture of the disease by showing that the only treatment that is effective is roentgen treatment. It seems a remarkable thing that this disease, which has all the destructive characters of a new growth and responds to x-rays like a new growth, is not neoplastic at all but is due to some defect in the lipoid metabolism in the body. He has shown conclusively that the lesions do heal after roentgen treatment. I think that if one remembers that such defects can be caused by such a disease as this, one will be on the lookout for them and that a good number of the cases can be cured by roentgen treatment, whereas they might be considered quite hopeless if one put them in the class of neoplastic diseases.

DR. L. A. MILKMAN, Scranton, Pa.: Xanthomatosis, as Dr. Sosman has brought out, is due to a disturbance of lipoid metabolism and is a purely mechanical process. There is a deposition of lipoids in the various tissues of the reticuloendothelial system which embryologically is of mesenchymal origin. After the deposition of the lipoids, myelocytes and other cells appear as a protective mechanism. Giant cells are seen in great numbers and early observers considered them a sign of a malignant condition. Broder lists twenty diagnoses, from giant cell tumor to multiple myeloma in children, which he considers forms of xanthomatosis. A patient with xanthomatosis admitted to the Scranton Hospital did not have exophthalmos, diabetes insipidus or gingivitis, presenting only multiple defects in the bones of the skull. In the brain and meninges were tumor masses arising from the dura. These masses were brownish and of rubbery consistency. When the skull was opened it was found that the masses did not infiltrate it but by pressure produced erosion and absorption of the osseous tissue. The onset was sudden. A tumor on the right side was noticed two months previous to his entrance to the Scranton State Hospital and was getting larger. Roentgen examination did not disclose the etiology. Exposures of all the long bones and of the lungs were made. In the lungs, thickening of the markings, especially toward the bases, was noted. This patient was a miner, and a certain amount of the thickening of the markings is occupational. The rest I considered possible early bronchogenic carcinoma with metastasis to the skull. In the literature it is stated that the lungs as well as the pleura may be infiltrated by lipoids. Aschoff thought that the lungs took part in lipoid metabolism. Later, experimental work proved that the lungs act merely as a storehouse for lipoids. The defects in the bones have been produced in experimental animals such as rabbits. The results were criticized because rabbits are herbivorous. The defects were reproduced in omnivorous animals. The tumor masses in the dura varied in size from a pea upward and infiltrated the entire skull. In cases in which diabetes insipidus was found the sella turcica was infiltrated, producing a disturbance of the pituitary. The exophthalmos was due to pressure on the eye. The condition represents a metabolic disease of systemic origin. In infancy it involves the liver, spleen and mesenteric lymph nodes. The pleura, lungs and glandular tissue may also be involved. The type of symptoms produced depends on the localization of the lipoid deposits. Whether trauma or infection localizes the condition is not known. Rowland of Detroit and Hertzberger of Moscow independently described the condition as a skeletal form of Niemann-Pick disease.

DR. E. C. VOGT, Boston: There seems to be little to add to what Dr. Sosman has already said. He first called attention to the value of roentgen treatment, and his suggestions have been followed with great benefit to the patients. It has been my experience that I can clear up the lesions readily, but they do not stay healed. Recurrences may take place in the same place or in other bones. My recent policy has been to give smaller doses. In this way I can carry on the treatment with less danger of permanent damage to the skin and superficial structures and still get the desired results.

SURGERY OF SUPPURATION IN THE FASCIAL SPACES OF THE THIGH*

J. E. MILGRAM, M.D.
IOWA CITY

In a hand infection today, due cognizance is taken of the tendon sheaths and, more particularly, of the palmar spaces and the thecal bursae in visualizing the spread of the infection and locating incisions where they will aid drainage most effectively. Similar information concerning the foot is available. In the case of the thigh, the situation is not as pleasing.

One is frequently confronted with purulent collections about the groin, buttock and thigh. It is customary to wait for them to localize. They are incised over the apex of the region and healing is awaited. Usually, they act satisfactorily, but not infrequently they fail to do so, and draining sinuses, often multiple, persist for protracted periods. From time to time, a new collection appears often quite distant from the primary site, yet apparently related in some obscure fashion. I have encountered patients draining intermittently in such fashion for as long as thirty years.

The reason for this rather lackadaisical system of incision and drainage lies primarily in the faulty concept of the thigh now in vogue even in the best anatomic circles. This has been transmitted unchanged to surgical practice.

If one reads the textbooks of today, and studies, for example, serial cross-sections of the thigh, one obtains the impression that the thigh is a compact structure of muscles and bones, encased in fascia, subcutaneous tissue and skin. Between the muscles run irregular septums or prolongations of fascia. This orthodox description is not correct. The thigh contains large and very important fascial spaces extending its full length, traversed only by fine areolar bridges. A revision of our understanding and treatment of thigh infections is necessary in the light of this concept. Just as the spatial anatomy of the hand is a comparatively new surgical acquisition, so is a painstaking study of the fascial spaces of the lower extremity a recent accomplishment. It is a contribution of Henry J. Prentiss, late professor of anatomy at the University of Iowa College of Medicine, whose sudden death three weeks ago has left his topographic studies unpublished. Probably the greatest anatomist of our generation, his epochal work on fascias is as yet unavailable.

During the past five years, as a student under him, it has been my privilege to examine the fascial

* From the Departments of Orthopedic Surgery and Anatomy, State University of Iowa College of Medicine.

* Read before the Section on Orthopedic Surgery at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

spaces of the lower extremity in approximately 200 cadavers. During this period I have tried to apply his anatomic concepts to a clearer understanding of the reasons for and paths of suppurative extension in the lower extremity. The surgical problems have been clarified and treatment simplified. If the following material on the thigh smacks of over-abbreviation and verges in places on dogmatism, I plead limitation of time.

ANATOMY

Tendons are provided with mesothelial sheaths or thecae for freedom of movement. The more superficial muscles of the thigh are provided with fascial compartments which serve the same purpose. These spaces are not hypothetic cleavage planes to be illustrated as lines in the commonly conceived cross section but are actually capacious and definite compartments which can be distended by air injected under zephyr pressure. These spaces, demonstrable on the living body or the cadaver, come to contain and guide pyogenic products in disease. The "fascia lata strip," which is removed for arthroplasties, with its one gliding surface is but a part of the wall of one of the compartments of the thigh.

When the skin and superficial fascia have been dissected off over thigh, buttock, knee and leg, a dense,

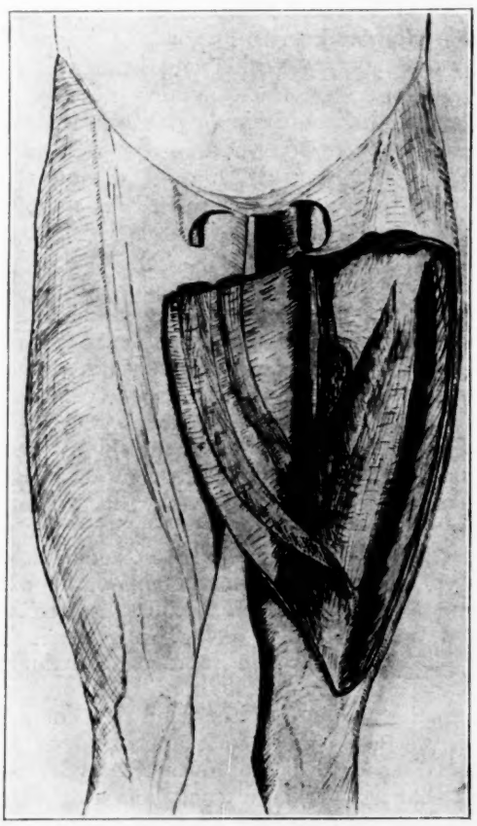

Fig. 1.—The anterior compartment of the thigh. From H. J. Prentiss. The vaginal fascia has been cut and reflected with the rectus femoris and sartorius muscles visible and the reflected roof of the compartment.

white, glistening fascia is left surrounding the extremity. This fascia, called in various regions by different names, is termed by Prentiss as "vaginal" or ensheathing fascia, for it does precisely that to the entire body. It encircles the thigh. If this fascia is pricked a few inches above the knee on the outer side, and compressed air is permitted to enter under gentle pressure, at once the vaginal fascia is seen to balloon out. The thigh swells mightily. The entire surface floats up, carrying with it the rectus femoris and sartorius muscles from shortly above the patella to the level of Poupart's ligament. The fascia is now drumlike. The lateral surface of the thigh has also markedly swelled, the iliotibial band (merely a thick-

Fig. 2.—The posterior compartment of the thigh. From H. J. Prentiss. On left: Vaginal fascia of posterior aspect of thigh split and also gluteus maximus, which is incorporated in the vaginal fascia. Muscle fascia of hamstrings intact. Sciatic nerve visible in floor of compartment. On right: Vaginal fascia split down hamstring insertions. Popliteal space is untouched. Dark space beneath reflected gluteus maximus is the communication with the anterior compartment.

ening of the vaginal fascia) and the tensor fascia femoris muscle rising with the fascia as far laterally as the outer hamstring muscle group. It is only on the medial aspect of the thigh over the adductor muscles that the vaginal fascia appears glued down to the underlying structures.

As the thigh is watched, the observer will find that inflation of the posterior aspect is now commencing. The buttock gradually distends until the heavy gluteus maximus muscle has floated out like an inflated bag. Extending down from beneath the gluteus maximus is seen a single broad inflated tube surrounding the hamstring group. This tube diverges like a pneumatic trouser leg at the apex of the popliteal space to run down each side of this region to the insertion of the hamstrings, on the tibia and fibula.

It is apparent that there exists a large anterior or anterolateral compartment the entire length of the thigh which communicates superiorly and laterally with a large posterior compartment under the gluteus maximus. In direct communication with the latter space is a trouser leg portion extending down over the diverging hamstring muscles.

Anteriorly, this inflated vaginal fascia is now incised from the level of the anterior superior spine to the knee so that the walls of this compartment may be

examined. Traversing these compartments are frail bridging septums of fine areolar tissue. In some regions they are more numerous than in others. The picture obtained by air inflation is confirmed. The muscles which floated up (as the rectus femoris and the sartorius) are in the substance of the vaginal fascia, the fascia splitting to enclose them. The rectus femoris a few inches above the knee leaves the vaginal fascia to join the vasti in the common tendon of insertion of the quadriceps. Examination of the floors of the compartment shows that the vastus internus, medialis and lateralis muscles, for example, are covered with a fine glistening layer of fascia which may be termed muscle fascia. This muscle fascia forms the floor of the compartments and is limited laterally by the insertion of the vaginal fascia on the linea aspera. When one examines the adductor muscles, however, one finds that along the medial edge of Hunter's canal the vaginal fascia is fused with the muscle fascia of the adductor muscles. In the floor of the anterior compartment is the vascular sheath, and the anterior femoral nerve.

Posteriorly, on dividing the gluteus maximus transversely, one notes how its muscle belly, which lies between two layers of the same layer of vaginal fascia, is continued laterally from the fascia forming the roof of the anterior compartment. The anterior half of the fibers insert simply into the vaginal fascia, and the posterior half of its fibers leave the vaginal fascia to insert on the gluteal tuberosity of the femur. On following the vaginal fascia down, dividing it longitudinally over the hamstrings, one sees the diverging legs, each with its tube of vaginal fascia, and finds that the popliteal space is left intact. On puncturing the fascia bridging the popliteal space and inserting the air nozzle, one finds that this space inflates together with a space on the back of the leg but is not connected with the thigh spaces.

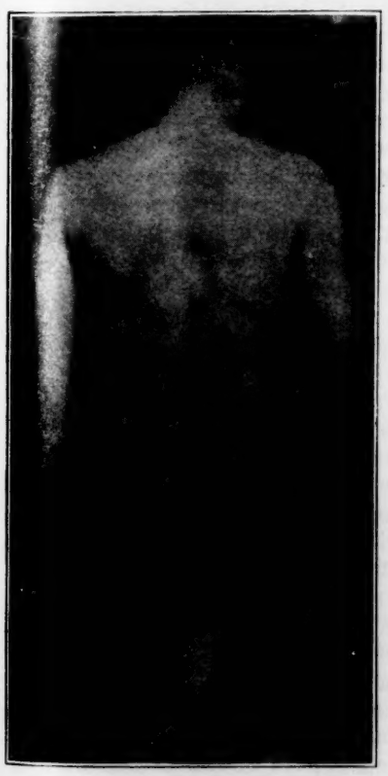

Fig. 3.—A persistent right compartment abscess inadequately drained by a split muscle incision.

It may be noted especially that the anterior and posterior compartments communicate above and around the greater trochanter and the deep trochanteric bursa. At this point of transition, the roof is the vaginal fascia containing the entire tensor fasciae femoris muscle and the entire gluteus maximus muscle save for one half of the fibers of insertion of the latter. The floor is the muscle fascia over the gluteus medius and minimus muscles.

The salient and anatomic features of the situation may be listed thus:

1. There are two large compartments in the thigh—an anterior and a posterior. They communicate over the greater trochanter under the vaginal fascia.

2. The important structures immediately beneath the floor of the anterior compartment are the anterior femoral nerve and the great artery and vein.

3. The structure of most interest in the floor of the posterior compartment is the great sciatic nerve.

4. Several bursae have easy access to the compartment, in particular the large, deep trochanteric bursa, which lies between the vaginal fascia above and the greater trochanter below.

5. The popliteal space belongs in a special sense to the leg and not to the thigh.

Fig. 4.—Spontaneous perforations of a fascial space collection. Sinuses outline fascial insertions of gluteus maximus. Pencil indicates two other marginal sinuses.

PATHOGENESIS

These large compartments are obviously "dead spaces" into which adjacent pathologic processes accompanied by suppuration can discharge purulent material. Once in these spaces, such pus may travel a very long way into communicating spaces. Petit in the seventeenth century observed that in performing amputations below the knee one must take care not to expose the hamstring insertion, or infection will travel up the thigh; that is, one should avoid opening the divergent trouser legs of the posterior compartment.

Example.—In an infected osteotomy of the tibia, in the upper third, pus entered the sheath of the biceps insertion, traveled up the trouser leg, the posterior compartment, and came to lie under the gluteus maximus. It then passed down the anterior aspect of the thigh. It was evacuated by incision of the vaginal fascia below the anterior superior spine.

In this paper I can only briefly remark on the various manners in which compartment infections have been initiated.

GROUP I. HEMATOGENOUS INFECTIONS

A. *Infected Hematomas of the Compartment.*

Example.—An elderly man fractured the femoral neck and shortly afterward was brought to the hospital with the thigh greatly swollen. Within a day, the temperature became septic and the patient drowsy and delirious. Because of a previous kidney episode, a diagnosis of uremia was made. After seventeen days of apparent uremic sepsis, the swelling of the thigh was properly interpreted and a huge abscess cavity under the

vaginal fascia extending up far under the gluteus maximus was opened. It was obviously an infected hematoma extending from the fracture into the compartments. The patient in six weeks made an uneventful recovery as far as the infection was concerned.

B. *Diabetic "Cellulitis."*—Extensive involvement of the compartments in diabetic patients is not infrequent. They are generally unrecognized for a number of weeks before they perforate to the surface at some point and a diagnosis of "diabetic cellulitis" is made.

Example.—An elderly diabetic patient, stooping over three weeks before admission, felt sharp pain in his thigh radiating

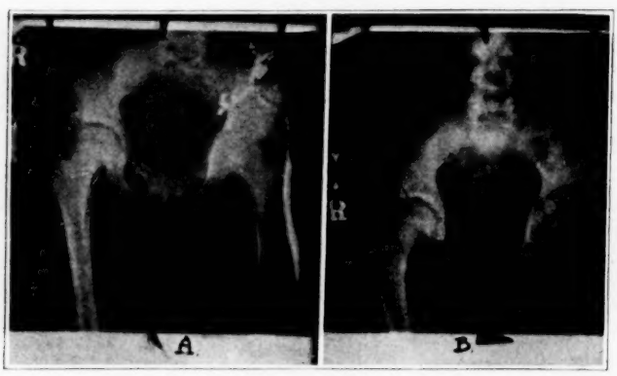

Fig. 5.—*A*, same patient as in figure 4. Iodized oil in both compartments. Primary focus, left ilium. *B*, four months later. Previous injection still persists in nondraining portions of the spaces into which the iodized oil has entered.

into his calf. Inability to walk soon appeared, and he took to bed with pain, not very severe, but continuous. Temperature elevation appeared at the onset. On examination, the knee was flexed, the hamstrings were indurated, and the posterior aspect of the thigh was swollen. The popliteal space was not involved. At operation, the posterior compartment was opened and a huge abscess cavity evacuated. Staphylococcus aureus-hemolyticus was isolated from the abscess and on three separate occasions from the blood stream. The patient recovered, to die three months later of a bilateral lobar pneumonia and septicemia.

C. *Embolization After Operative Procedures.*

Example.—Six weeks after a reconstructive operation on an ostearthritic hip which had healed apparently in normal fashion, primary union having obtained, the patient developed a septic sore throat. Several days later, the thigh became tender. Incision later revealed the spaces of the thigh, which had been exposed by operation, to be widely involved. The hip joint, however, remained unaffected. The patient died of streptococcus hemolyticus sepsis.

GROUP II. INFECTIONS DIRECTLY INTRODUCED

A. *Introduction During Medication.*

I. Ergot at labor.

II. Bismuth in buttock.

Example.—An elderly tabetic patient after bismuth injection developed an induration of the buttock and crepitation. The thigh, as well as the buttock region, became markedly swollen. Incision revealed a gas bacillus infection of the gluteus maximus muscle, the gas escaping into the posterior compartment. The patient died of B. welchii septicemia.

III. Hypodermoclysis.

Example.—A. B. welchii infection followed the introduction of needles into the thigh. At autopsy, the anterior and posterior compartments were inflated with gas, and organisms were recovered from the muscles forming the walls of these compartments. Death resulted.

In this connection, one must remember that the thigh spaces may become inflated with gas from lesions above or below without the compartments actually being involved, and that therefore the presence of gas alone in the thigh is not a counterindication for amputation at that level. The lesion containing the actual organisms may be localized to a much more distal site and amputation may be indicated.

Example.—While he was burning brush, the overalls of a young man became ignited. His feet were burned to a crisp before the flames could be extinguished. A Bacillus welchii infection was discerned on the leg in a few days. The thigh became tremendously enlarged and a sense of "crepitation" was elicited over the thigh as well as locally over the leg. Death occurred within twenty-four hours. At autopsy, careful study revealed that the organisms were not present in the thigh but were localized to the leg. Nevertheless, the compartments of the thigh were inflated with hydrogen gas, so that when a puncture was made through the vaginal fascia the gas escaped with a loud hiss and the thigh collapsed like a punctured balloon. Culture of the gas and culture and section of the fascial compartments through their extent were negative for B. welchii. It is conceivable that had this boy not died so promptly of sepsis, amputation above the knee might have been feasible, despite the fact that gas was present. One must distinguish between gas bubbles in tissues and gas loose in a natural compartment of the member.

B. *Introduction by Extension of Purulent Foci.*

I. Extraspatial lesions rupturing into compartments. (*a*) Psoas abscesses arising from the spine, the sacroiliac joint, or retroperitoneal lesions as suppurative glands. The variety of these is very large, and tracing their course with iodized oil will bring to light much interesting information as to the path by which the compartment was involved. An anterior route under Poupart's ligament and a posterior route through the great sacrosciatic notch are the commonest varieties. The organisms concerned may vary from pyogenic invaders to tuberculosis.

(*b*) Lesions of the ilium perforating the gluteus medius, for example, which may rupture directly into the posterior compartment, coming to point at times as far from the original site as the lower third of the femur.

Fig. 6.—Another space collection persisting after the acetabular lesion (focus) has healed.

(*c*) Lesions of the femur. (1) Hip joint. Rupture anteriorly or posteriorly may result in extensive extra-articular joint collections. If complete drainage is to be instituted, due cognizance must be taken of the frequency of these spatial collections in locating incisions. The association of pain distributed over the course of a major nerve with pus in the corresponding compartment may often be very striking. Occasionally, in infants, a sequestrated head may be found beneath the gluteus maximus swimming in a pool of pus which fills the posterior compartment.

(2) The greater trochanter. Osteomyelitis or tuberculosis, at this junction of the two compartments, with no muscular attachments covering the focus, will involve the spaces extensively. One such case is still draining thirty years after onset, the walls of the compartments being reduced to large sheaths of scarred connective tissue covered with granulation tissue.

(3) Lesions of the shaft generally wall off progressively, so that infections of the spaces are fairly

well localized. Abscess stripping is generally subperiosteal and not between fascial planes. Only when the patient has been markedly septic, and resistance has obviously been poor, is extensive involvement of the spaces observed. In reoperating on old osteomyelitic foci, it would seem advisable to traverse the old sinus region rather than healthy regions, where compartments may be exposed to contamination.

(4) The knee joint. Here the vaginal fascia blends so intimately with the capsule that knee infections do not as a rule dissect the layers. Rather do they burrow

Fig. 7.—Cadaver: posterior compartment incised and gluteus maximus reflected. Deep trochanteric bursa is inflated. The intimate relation between this bursa and the compartment is demonstrated.

clear through the capsule and fascias to become subcutaneous, or perforate posteriorly into the popliteal space, whence they involve the calf.

(*d*) Bed sores. Lesions commencing over the greater trochanter and occasionally over the sacrum may be followed by extensive fascial space involvement. This is particularly true in myelitis of whatever cause.

II. Intraspatial lesions arising from structures within the compartments. (*a*) Bursae. Lesions are encountered in various bursae of the thigh. Examples are the bursae over the tuberosity of the ischium and more particularly the deep or great trochanteric bursa, which is not infrequently the site of tuberculosis and pyogenic lesions. Eighteen cases of disease of this bursa have been observed by me. Four of the chronic lesions had remained unrecognized from ten to thirty years, symptoms persisting during the entire period. Extension from these lesions is particularly easy, as the bursa is in direct contact with both compartments. Until the nature of the lesion is recognized, adequate treatment is not possible.

(*b*) Lymph nodes. The inguinal lymph nodes apparently are central nodes of a chain which arises at the big toe and drains along the course of the long saphenous vein, whereas the outer aspect of the foot and leg drains through the popliteal glands to retroperitoneal glands. One should therefore not overlook the possibility of an inguinal adenitis as the cause of suppuration in the compartments in the thigh, particularly when a pyogenic lesion is present on the big toe.

(*c*) Operative infections following removal of vaginal fascia for use in arthroplasties or other reconstructive procedures. Such infections, while extensive, are readily drained by removal of sutures. Extension to the posterior compartment may necessitate attention, however.

COMPLICATIONS OF COMPARTMENT INFECTIONS

I. *Intercompartment Extension.*—Except in fulminating infections or devitalized states, as incidental to sepsis, diabetes or myelitis, evidence of walling off appears early with consequent localization of the lesion to one compartment. However, if the lesion is in the region of the greater trochanter, both compartments are easily accessible to the advancing disease. Extension is minimized by large properly placed incisions and enforced rest.

II. *Persistent Drainage.*—The common causes are:

A. Inadequate drainage of the primary focus. Epithelization of the marrow cavity should be considered, in passing, in dealing with chronic osteomyelitis.

B. Inadequate drainage of the fascial compartment. Although the primary focus has healed, the walls of the compartment may persist with the infection. They are covered with shaggy granulations over extensive areas. As a result of scarring, they are poorly supplied with blood. They are constantly agitated by the contraction of muscles situated in the substance of the fascia and are rubbed by each motion of the limb. Here, incision of the vaginal fascia of the appropriate compartment, aided by division of the gluteus maximus insertion on the femur when the posterior compartment has been involved, has cleared up lesions which have drained for years through repeated inadequate incisions.

The type of organism is obviously a major factor. Tuberculosis, originating in the bursae about the hip and trochanter, is frequently unrecognized. Even when clinical evidence of the pyogenic nature of the lesion appears overwhelming, histologic study and guinea-pig inoculation are indicated. Surprises are a commonplace.

III. *Involvement of the Contents of the Spaces.* — A. Anterior femoral nerve involvement with appropriate radiation has been observed numerous times. It may be the main symptom in a suppurating hip joint which has been presumably well drained through a posterior incision. Evacuation of pus from the anterior compartment will give relief as a rule.

Fig. 8.—Erroneously diagnosed as coxitis in child, aged 4 years; a right sided compartment infection; intraspatial group. Origin is bursal; shadow of pus is definite; vaginal fascia is raised off tronchanter on right by pus in compartment. Complete recovery resulted after compartment drainage.

B. Sciatic nerve involvement is common and most distressing. The nerve may be found covered with granulations and surrounded by pus. It usually functions well in a motor sense, but pain may be so unbearable as to necessitate opiates continually. Drainage of the posterior compartment usually relieves the distress, unless the lesion is tuberculous.

C. Venous occlusion evidenced by unilateral edema. Femoral phlebitis, particularly in myelitis, has been observed but is not very frequent. Despite the fre-

quency with which psoas abscesses involve the anterior compartment, venous occlusions are rare.

D. Arterial thrombosis. This would appear quite possible, but I have never encountered it. I have observed bilateral internal iliac thrombosis occurring in the retroperitoneal collections in sacro-iliac disease, with bilateral femoral occlusion. There is little reason why a similar process should not appear more peripherally. The situations are quite analogous.

IV. *Scarring of the Walls of the Spaces.*—This undoubtedly interferes with function about the hip and knee. The gliding surfaces have been removed and the motor mechanism suffers. Physicians are too apt to pay attention only to what the roentgenogram shows and forget the "joints" between soft parts. Stiffness has been observed after arthroplasties where much hemorrhage has occurred into the compartments. After pyogenic lesions, scarring is even worse. The quadriceps is particularly apt to be hindered in its functions.

TREATMENT

Briefly stated, efficient treatment requires:

I. Accurate preoperative localization of the primary focus, if possible. The common sources of error lie in the failure to think of pathologic changes in the bursa or to seek silent lesions in the ilium, sacrum, sacro-iliac joint, spine and retroperitoneal structures. In infections of the bursa and the posterior compartment, hip joint disease may be simulated. However, opening of the joint may result disastrously, as the joint also thereupon becomes involved.

II. Efficient drainage of the primary focus—bone, bursa, or gland, wherever possible. Since compartments are unavoidably traversed, incisions should be left wide open and should be as direct as possible. Drainage through split muscle incisions is an undesirable procedure.

III. Efficient drainage of compartments where involved.

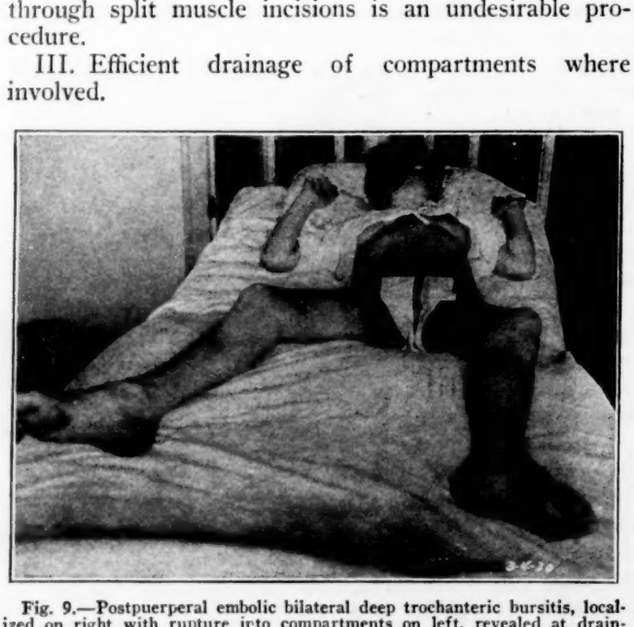

Fig. 9.—Postpuerperal embolic bilateral deep trochanteric bursitis, localized on right with rupture into compartments on left, revealed at drainage. Position was steadfastly maintained for three weeks. Blood culture was positive: Streptococcus hemolyticus sepsis. Recovery resulted after drainage.

To lay the anterior compartment wide open, the incisions are best linear and quite laterally placed behind the line of the greater trochanter, for here, only the vaginal fascia and subcutaneous tissue need be divided. They should be long. A small bridge of tissue may be left, if desired, to prevent too wide separation of skin edges in case it is necessary to open practically the entire length of the thigh. With the gloved finger, pockets should be gently broken down, for loculi may be closed. The areolar septums tend to wall off collections.

If the posterior compartment is involved, as when the lesion is in the region of the trochanter, it is very essential to divide the upper two thirds of the gluteus maximus fibers where they insert on the gluteal tuberosity of the femur. This can be accomplished, if desired, through the upper end of the lateral incision over the region of the trochanter. Curving the upper end of this incision backward will facilitate this division. Simple splitting of the thick gluteus maximus in the direction of its fibers is liable to be quite unsatisfactory, drainage being blocked in a short time. The trunk of the gluteal artery should be avoided, for hemorrhage from this is difficult to control. By locating the incision laterally, the drainage point is situated as far as possible from nerves and vessels, and avoids muscle bellies. One should avoid opening an uninfected compartment. This is particularly true in draining infections of the posterior compartment about the hamstrings. Here, one should be careful not to open the popliteal space or pus may later appear in the calf. Longitudinal medial incisions suffice. The small sciatic nerve is avoided by dividing only the vaginal fascia trunk over the hamstrings, and not cutting through the muscle fascia beneath which the nerve trunk is located.

Fig. 10.—Same patient as in figure 9 thirty-one days after drainage. The incisions are visible. Gluteus maximus insertions on femurs were divided at operation.

IV. Rest. For the past five years, I have applied the principles and details of the Orr method to the treatment of these soft tissue infections. Petrolatum packs, casts without windows, change being made at intervals of from six to eight weeks constitute the usual regimen. Secretions are quite profuse from large mesothelial surfaces, necessitating careful protection of the skin with petrolatum, and occasionally weekly changes of the outside (only) layers of the dressing. The results have been pleasing.

ABSTRACT OF DISCUSSION

DR. LEO MAYER, New York: Ever since Dr. Kanavel published his book on infections of the hand, every surgeon has thought more clearly and anatomically on the subject of suppuration, and it is for that reason that I, for one, welcome most cordially this contribution of Dr. Milgram's. There are

a number of points which are not clear to me and which I wish Dr. Milgram would bring out more definitely when he closes the discussion. I understand clearly the anterior fascial compartment and the posterior fascial compartment, the communication between the two just above the greater trochanter, and the relationship to the gluteus maximus. I don't understand quite so clearly the relationship of the compartments along the inner aspects of the thigh. Do the adductors form a separate compartment? On the outer side the fascia is attached to the linea aspera, forming a continuous boundary wall between the anterior and posterior compartments throughout their extent except where there is a connecting space just above the trochanter. What happens along the inner wall? That is the part I don't understand. I liked Dr. Milgram's demonstration of the way in which the lower portion of the fascia just above the popliteal space divides into two parts resembling the two legs of a pair of trousers, one over the inner group of the hamstrings, the other over the biceps, leaving the popliteal space itself outside this fascial compartment or space. That, I think, is helpful when one is dealing with infections about the knee joint. One should remember that the popliteal space itself is outside the fascial space of the thigh and that the tendency will be for infection of the popliteal space to travel downward into the calf and not upward into the thigh. I have had a fairly large series of thigh suppurations, and although I have not been acquainted with Dr. Milgram's work I have in general been following the same principle; that is, the principle of free opening of these fascial spaces. I wish to emphasize the importance, in suppurations of the upper part of the thigh involving the space underneath the gluteus maximus, of making a free division of that portion of the gluteus maximus which is attached to the trochanter. In a case of tuberculosis of the hip joint I had a chance to demonstrate these compartments beautifully. The case went on to extensive suppuration, abscess formation, and in order to drain it properly I had to open up the entire anterior space from the hip joint all the way to the knee. Had I been satisfied with anything less than a 1½ inch incision, the patient probably would not have survived.

DR. ROBERT V. FUNSTON, Detroit: Dr. Mayer failed to mention Dr. Prentiss, the late anatomist at the University of Iowa. I think that he was one of the greatest of anatomists. He was an incessant worker and developed many fine points in anatomy. Dr. Milgram has been working with him for about five years, I think, and has taken particular interest in this anatomic work. That combination, an orthopedist who must in his work be intensely interested in anatomy, and an anatomist who thoroughly believes in practical application, is very likely to evolve something really worth while.

DR. FRANK OBER, Boston: The work that Dr. Milgram has described is a valuable contribution to surgery. It does not seem as if he considers the relation of the fascia of the thigh to the knee as thoroughly as he might. In septic infections of the knee joint there is often burrowing upward laterally in the fascial spaces as far as the greater trochanter posteriorly. On the medial aspect the pus travels along the adductor magnus to the femoral opening in Scarpa's triangle. Occasionally it goes through the femoral opening in the adductor magnus muscle. Early recognition of infection of the fascial space may save amputation and even life. It is not necessary to open the fascial space throughout. A small incision two or three inches long extending to the greater trochanter will give rapid drainage. The wound should be kept open by means of two large cigaret drains.

DR. J. E. MILGRAM, Iowa City: Dr. Ober's criticism is merited. In an attempt to simplify the situation at the knee, I said too little. I have seen a number of cases in which the infection succeeded in passing up the lateral aspect of the thigh, under the vaginal fascia. As far as the medial aspect of the thigh is concerned, it has been my experience that these collections have simply been subcutaneous, extrafascial. When they pass up to the region of the saphenous opening, they may there penetrate the cribiform fascia and enter the anterior compartment of the thigh. As a rule, however, these lesions remain superficial. The reason for this may be found in the answer to Dr. Mayer's question as to the location of the vaginal fascial on the medial aspect of the thigh. It becomes fused with the muscle fascia over the adductor muscles, folding over the great vascular sheath as it extends medially from the anterior compartment. Consequently there is no fascial space medially, and when infections do occur they are generally extrafascial. Dr. Funston's remarks concerning Dr. Prentiss are germane. I can say no more. I feel his loss keenly. He was deeply interested in the subject and helped me a great deal in its prosecution.

NEURITIS AND MULTIPLE NEURITIS FOLLOWING SERUM THERAPY *

GEORGE WILSON, M.D.
AND
SAMUEL B. HADDEN, M.D.
PHILADELPHIA

With the increased use of therapeutic serums in the past twenty years, much has been written of the various manifestations of anaphylaxis. Urticaria, arthralgia, adenopathy and cardiac collapse are well known complications of serum therapy. Coma and occasionally death have been reported following serum injection. Many reports of multiple neuritis and myelitis following the use of Pasteur treatment have appeared, and encephalitis following vaccination is well known. Another unpleasant complication of prophylactic efforts, and fortunately one less frequently seen, is multiple neuritis.

In 1912, Thaon [1] reported a case in which paralysis of the serratus magnus and other muscles developed following serum sickness due to the injection of 10 cc. of tetanus antitoxin. In 1915, Richardson [2] reported a case of severe tetanus with recovery, which was followed by a pronounced multiple neuritis that he attributed to the action of the tetanus toxin. Dyke [3] in 1918 wrote on neuritis following prophylactic injection of tetanus antitoxin and considered it to be allergic in nature. Thomas [4] cited two similar cases, one following the administration of antidiphtheritic serum and the other after antistreptococcic serum.

Souques, Lafourcade and Terris,[5] Lechelle, Thévenard and Lacan,[6] Katz,[7] Folly,[8] Crouzon and Delafontaine,[9] and Baudouin and Hervy [10] have reported cases of neuritis following the use of tetanus antitoxin. We have had the opportunity of observing six cases, records of which follow.

CASE 1.—A white youth, aged 17, seen June 8, 1929, had received a puncture wound in the thumb in May, 1929, for which he was given 1,500 units of tetanus antitoxin in the left side of the chest posteriorly just below the scapula. A few days later, hives developed over the entire body. The hives lasted two or three days, and the day following their disappearance he awoke with severe pain in both shoulders.

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* Read before the Philadelphia Neurological Society, May 22, 1931.
* From the Neurological Department of the School of Medicine, University of Pennsylvania. The cases on which this paper is based were studied at the Abington Memorial Hospital, the Philadelphia General Hospital and the University Hospital.

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Heat relieved the pain in the right shoulder, but it persisted in the left. On the eleventh day after the serum injection, paralysis developed in the movements of the left shoulder. This condition persisted up to the time the patient was first seen. Examination showed a left circumflex palsy with anesthesia in the nerve area and only slight response of the nerve to faradism. The supraspinatus and infraspinatus muscles were similarly affected. Later a complete reaction of degeneration was found in the affected muscles, which became profoundly atrophic. After four months, improvement began. An occurrence of interest in this case was numbness of the right side of the face and whole right side of the body, which developed on July 8, approximately two months after the injection. There was no reflex disturbance at this time. Pain, touch and vibration were all diminished on the right side. This condition was not associated with any generalized symptoms, and it cleared up within a few days; it may have been the result of a cortical edema. Reexamination of the patient, May 8, 1931, disclosed that he had entirely recovered.

CASE 2.—A white boy, aged 7, received a laceration of the right ear in May, 1930, and was given 1,500 units of tetanus antitoxin in the left deltoid. A localized urticaria developed the following day at the point of injection and quickly disappeared. May 19, seven days after the injection, he was admitted to the Abington Memorial Hospital with serum sickness. He had swelling and redness at the point of injection and a generalized arthralgia. The day following admission, or thirteen days after the serum was given, a left musculospiral palsy developed which was associated with adenopathy in the corresponding axilla. The reflexes and sensation in the affected extremity were normal. The muscles responded very feebly to a strong faradic current. At the end of six weeks' treatment, which consisted of protecting the paralyzed muscles against deformity and of the administration of massage and faradism, this patient made a complete recovery.

CASE 3.—A white man, aged 40, a fireman in the department of public safety, Philadelphia, whose case was reported by Dr. Owen and Dr. Hadden,[11] gave the following history: Dec. 18, 1930, he suffered a puncture wound of the right foot, for which as a prophylactic he was given, the following day, 1,500 units of tetanus antitoxin into the anterior abdominal wall. December 25, a severe generalized urticaria developed, which was relieved by the injection of epinephrine. December 28, he was awakened during the night by very severe pain in the neck, worse on the right side; he had pain also in both shoulders, hands and forearms and in the interscapular area. He could not move his fingers and wrists, and said that they felt swollen and tingled a great deal. The pains and paresthesias continued until the end of the first week in January. The power in the left upper extremity was recovered quickly and by January 5 was quite normal except for slight weakness in the hand grasp. At this time, marked weakness in the grip of the right hand and about 70 per cent loss of power in the extensors of the wrist were noted. He complained of paralyzing pain in the neck, shoulders, interscapular area and both arms. Pressure over the muscles of the right side of the neck, in the right axilla and over the nerve trunks caused severe pain. On abduction of the arm at the shoulder, which caused stretching of the nerve trunks in the axilla (Lasègue's sign in the upper extremity), severe pain was elicited. No objective impairment of sensation could be detected. The tenderness of the nerve trunks was present in the left arm but to a much less degree. The biceps and triceps muscles on the right were weak and their reflexes were not obtained, whereas those on the left side were normal. The paralysis improved rapidly and by January 19, one month after the injury, the patient was able to return to active duty. A recent examination reveals that power in both arms and hands is normal. There is a moderate winging of both scapula. The patient states that subjectively his arms and hands do not feel as strong as before the neuritis developed.

CASE 4.—A white youth, aged 17, gave the following history on admission to the University Hospital, Dec. 12, 1930: He was shot in the right popliteal space, November 10, and was immediately given tetanus antitoxin intramuscularly in the left thigh. November 16, there developed a swelling of the right thigh and knee with severe local pain. November 17, he experienced pain in the arms from the elbows upward into the neck, so severe that he could not sleep for four or five nights. The next ten days he could not move his head from side to side without causing great discomfort. The pain disappeared by December 1, and after that he had only occasional shooting pains in the right arm. Weakness was associated with the pain and became more apparent as the pain disappeared. The left arm had improved so that he was able to perform all movements with comparative ease, but there was definite weakness. At present he cannot elevate his right arm at the shoulder at all nor can he abduct it or raise it behind him. He can flex and extend the arm at the elbow, but the power is not good. Other movements of the right upper extremity cannot be performed well. Electrical examination of the muscles involved showed reactions of degeneration in the right deltoid, supraspinatus and infraspinatus muscles and in the left deltoid. The only sensory disturbance noted was loss of pain, heat and cold sensation in the right circumflex area.

CASE 5.—A white man, aged 31, had a mild attack of diphtheria in the latter part of October, 1930; he was treated with antitoxin. About November 1, a severe neuritis developed. The patient had been released from quarantine and was entirely well two days before the neuritis began. During the eight days he was quarantined he had what he termed a "dropped palate," but he had neither nasal speech nor regurgitation of fluids through his nose. The pain which developed ran from the right shoulder to the right side of the neck and down to the elbow. The same distribution of pain was present on the left but was only half as severe. The neuritis persisted for three weeks. The right deltoid was greatly atrophied, the left slightly. The biceps muscles functioned well; the left triceps was a little weak, the right normal. He was analgesic in the circumflex area on the right, the area for the loss of pain being smaller than that for touch and temperature, but touch was not entirely lost in any part. On the left the impairment of sensation was slight in the corresponding area. He had complete deltoid paralysis on the right; he could elevate the left upper extremity above the shoulder but, when resisted, the movement was poor. Both upper extremities tired quickly. The lower limbs were not affected, although the knee jerks were weak. The achilles reflexes were normal.

CASE 6.—A white woman, aged 17, was admitted to the University Hospital, May 5, 1931. She came for study of a progressive paraplegia of five years' duration, but an added factor in the history follows. She had never had any trouble with her right or left arm until she had an acute illness in March, 1931, and was given an intramuscular injection of diphtheria antitoxin in the right buttock. Three days after the injection, severe pain in the shoulders suddenly developed. The next day both hands became swollen, particularly the fingers, and the palmar aspect of the right hand was painful, but not that of the left. The pain in the right shoulder region was excruciating, and the patient could not elevate or move the right arm because of the pain, which lasted about two weeks. Following the disappearance of pain, she experienced generalized weakness in the use of the right arm. At present she has a moderate degree of atrophy of the right supraspinatus and infraspinatus muscles as compared to the left. Rotation of the humerus is accomplished with much less power than on the left side. She states that the entire right hand and arm are weak. Sensation is normal.

COMMENT

Most of the cases of neuritis following serum therapy reported in the literature have followed the injection of tetanus antitoxin; some developed after the injection of diphtheritic antiserum, and one followed the injection of antistreptococcic serum. It is granted that multiple neuritis is a common complication of diphtheria, the result of the diphtheritic toxin. Jacokleva[12] reported multiple neuritis following the inadvertent injection of

11. Owen and Hadden: Proc. Acad. Surg., Philadelphia, May 4, 1931.

12. Jacokleva, J.: Diphtheritic Polyneuritis After (Inadvertent) Injection of Diphtheria Toxin, Zentralbl. f. d. ges. Neurol. u. Psychiat. **47**: 203, 1927.

diphtheritic toxin mistaken for toxin antitoxin mixture, several cases proving fatal. It is our feeling, however, that with the early injection of diphtheria antitoxin with the resulting neutralization of the toxin, these complications are avoided, and today when they do occur many are the result of the anaphylactic serum reaction. This is borne out by several cases in the literature and by those here reported, when after apparent recovery from mild diphtheria and during the serum sickness multiple neuritis developed. In tetanus, multiple neuritis does occasionally occur, but it is rare; Hnatek [13] has reported a case in which it occurred although antiserum was not employed; but, in some cases in which tetanus never develops but a prophylactic serum injection is given, it is inconceivable that there should be enough unneutralized toxin in the serum to cause neuritis without causing clinical symptoms of tetanus.

No case presenting this condition has come to autopsy, so the neuropathologic condition has not been definitely determined. Mason [14] has reported four cases of optic neuritis, describing one case in detail. In three of his cases, optic neuritis developed following the injection of antipneumococcic serum, and in one following the use of antimeningococcic serum. The optic neuritis in all cases developed during the course of serum sickness and subsided completely when the serum sickness disappeared. Kennedy [15] reported severe symptoms referable to the central nervous system in patients subject to angioneurotic edema in whom, presumably, focal edema of the brain existed. We have seen a case of allergic migraine and hay fever, which showed jacksonian epileptiform attacks, in which removal of wheat from the diet has given relief of symptoms for a two year period. It is our belief that edema of the nerve trunks develops similar to the urticarial swelling in the skin. Both of these structures are ectodermic in origin, and this may explain their common reaction. The selectivity for the nerves of the brachial plexus is difficult to explain. Baudouin and Hervi explain this selectivity by chronaxy, pointing out that various toxins, such as lead, manifest a selectivity toward nerves possessing certain chronaxies, and that the reaction from serum injection picks out the nerves with low chronaxies.

In reporting these cases and in emphasizing their serious complications, we are fearful lest consideration of these facts deter physicians from the use of antiserums in indicated cases. That is far from our purpose; we do wish to suggest, however, that more careful testing for horse serum sensitization be employed and that desensitization be resorted to when indicated. In this day and generation, when the free administration of diphtheria toxin antitoxin mixture is employed, it is well to bear in mind that this is sufficient to render a patient sensitive to horse serum. We also wish to call attention to the remark of Braunlich,[16] who reports that serum sickness occurs much more frequently and is more severe following the use of fresh serum than when older serum is employed.

CONCLUSIONS

1. Neuritis and multiple neuritis are occasional complications of serum therapy and we regard them as anaphylactic phenomena.

2. The brachial plexus, especially the upper cord, is most frequently involved.

3. More careful tests for sensitization and desensitization should be employed before antiserums are given.

133 South Thirty-Sixth Street.

13. Hnatek, J. M.: Tetanus and Neuritis, Wien. med. Wchnschr. **55**: 997, 1905.
14. Mason, V. K.: Optic Neuritis in Serum Sickness, J. A. M. A. **78**: 88 (Jan. 14) 1922.
15. Kennedy, Foster: Cerebral Symptoms Induced by Angioneurotic Edema, Arch. Neurol. & Psychiat. **15**: 28 (Jan.) 1926.
16. Braunlich, George: Anaphylaxis Following the Injection of 1,500 Units of Tetanus Antitoxin, J. Iowa M. Soc. **17**: 450-451 (Dec.) 1927.

ROENTGENOLOGIC DIAGNOSIS OF LEAD POISONING IN INFANTS AND CHILDREN *

EDWARD C. VOGT, M.D.
BOSTON

My purpose in this paper is primarily to demonstrate certain roentgenologic signs of lead poisoning in infants and children and incidentally to call attention to the relative frequency of this condition as well as its possible serious consequence.

Like any disease, the apparent incidence is greatly influenced by the importance it bears in the clinical consideration, but it is also true that many cases will go unrecognized if some convenient diagnostic procedure is not readily available.

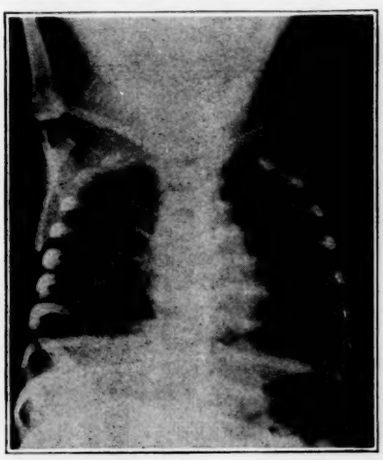

Fig. 1 (case 1).—A routine chest film of a breast fed infant, aged 6 months, admitted on account of vomiting for ten days and convulsions for two days. The dense zones at the anterior ends of the ribs gave the first clue to the correct diagnosis. (See also figure 2.) Blood smears showed 10 per cent stippled cells. The urine was not examined for lead. It was found that the mother had been using lead nipple shields. Recovery was rapid following the discontinuance of the nipple shields.

In 1926, C. F. McKhann [1] reported and discussed in considerable detail seventeen cases which had been treated at the Infant's and the Children's hospitals during the previous three years. Since August, 1929, when we first began to recognize the roentgenologic signs, till the present time thirty-two cases have been diagnosed in this clinic. Quite a number were detected on the roentgenograms before they were otherwise suspected, but the increased number recognized is due largely to the fact that the clinicians are now considering lead poisoning more frequently.

SOURCE

The most frequent source of lead affecting the health of infants and children is from paint off the furniture, woodwork and toys. As everyone knows, infants have a common tendency during the teething period to chew at anything they can get into their mouths. When sufficient lead paint is ingested, symptoms of plumbism develop. This occurs most commonly between the ages of 1 and 2 years.

Pica, or perverted appetite, which is often associated, is probably, at least in some cases, a manifestation of intoxication resulting from what was at first an inno-

* From the departments of roentgenology of the Infant's Hospital and the Children's Hospital.
* Read before the Section on Radiology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.
1. McKhann, C. F.: Lead Poisoning in Children, Am. J. Dis. Child. **32**: 386 (Sept.) 1926.

cent habit; for the majority, if detected early, return promptly to normal mentally and physically when the source of lead is removed.

Some of the advanced cases result fatally, while others present permanent cerebral damage. However,

Fig. 2 (case 1).—Films taken at intervals of about four months to show the broadening of the affected zone due to growth and the gradual elimination of the lead.

as the antecedent history is not always reliable, it may be impossible to say definitely whether the residual mental derangement is the result of the lead encephalitis or of a primary cerebral defect. The oldest patient in our series in whom pica was a prominent feature was a girl, aged 7½ years, who seemed particularly fond of the paint off her pencils and crayons at school.

Other sources of lead may be from lead water pipes, cooking or eating utensils, lead nipple shields and cosmetics used by the mother.

SYMPTOMS

The symptoms are chiefly neurologic and gastro-intestinal. The child becomes nervous and irritable and the disposition is changed. Vomiting and constipation are prominent features and there may be abdominal colic. Pallor, loss of weight and weakness are common, and in the more severe cases apathy, drowsiness, stupor and convulsions occur. Spasmodic twitchings, speech defects and slight stiffness of the neck may be present. Pain in the arms and legs was complained of by several patients. Paralysis of the extremities is a late manifestation of chronic poisoning and may be mistaken for poliomyelitis. The cerebral symptoms may simulate very closely those of brain tumor, while the vomiting and abdominal colic sometimes suggest an intra-abdominal surgical condition.

DIAGNOSIS

In the diagnosis a history of some source of lead is of course very important; however, not every infant that puts "things" in its mouth has lead poisoning. The symptoms should usually arouse the examiner's suspicions.

Of the laboratory observations, changes in the blood are among the most important diagnostic criteria. A secondary anemia is usual. Basophilic stippling of the red blood cells is considered one of the most reliable observations. Although these cells are not specific, if present in any considerable number lead poisoning is the most likely cause. They are quite transient, too, and are usually found only during the acute stages or during exacerbations resulting from infections. However, a good blood smear, well stained, has a lot to do with the demonstration of these stippled cells, and it seems probable that if properly searched for they would be found in some stages of all cases. Lead in the urine is perhaps the most convincing evidence, but the technical skill and apparatus necessary for making the test may not be available. The dark, so-called lead, line, at the gum margins, which is of considerable significance in adults, is seldom seen in small children.

The response to treatment or to the removal of the source of lead is of value in checking up on the accuracy of any of the diagnostic procedures for improvement in all except severe cases and is usually quite prompt.

ROENTGENOLOGIC SIGNS

A sign which we have come to regard with increasing confidence is that seen on the roentgenogram. It is characterized by a dense band at the growing margins of all bones but most evident at the ends of the long bones and anterior ends of the ribs. It has been observed in all our cases in which a diagnosis of lead poisoning was made, and on which films of the extremities were obtained.

I will discuss only briefly the cause and significance of the roentgenologic observations, and

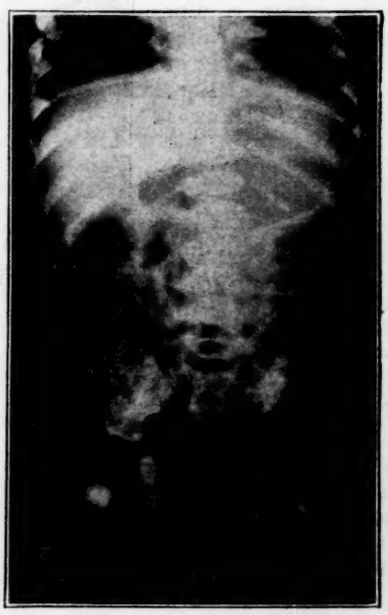

Fig. 3 (case 2).—This film was taken preliminary to a gastro-intestinal series. The patient was a 4 months old bottle fed boy admitted to the surgical wards with a diagnosis of probable Meckel's diverticulum. There had been intermittent attacks of vomiting, abdominal colic and blood in the stools since birth. On account of the dense bands at the margins of the ilia and upper femurs a roentgenologic diagnosis of probable lead poisoning was made (see figure 4).

Fig. 4 (case 2).—Extremities of the same patient shown in figure 3. On investigation it was found that the drinking water came through lead pipes in the home. Chemical analysis of the water showed excessive lead. These pipes were replaced and the child has had no more symptoms.

for support of my deductions I quote the following paragraphs pertaining to experimental data from the excellent monographs by Aub, Fairhall, Minot and Reznikoff.[2]

2. Aub, J. C.; Fairhall, L. T.; Minot, A. C., and Reznikoff, Paul: Lead Poisoning, Medicine Monographs, Baltimore, Williams and Wilkins Company 7, 1925.

It has long been known that calcium in bone tissue may be replaced by other elements with somewhat similar reaction, such as strontium.

That lead can chemically replace calcium may be shown by pumping lead solution of known concentration over crushed bone until the lead is completely absorbed. On analysis of the filtrate it is found that calcium is liberated in amounts varying with the lead absorbed. The degree of absorption depends on the hydrogen ion concentration, being greatest at p_H 7.8. This, as Aub points out, is of biologic interest and may account for the frequent development of acute intoxication following infections or acidosis.

During absorption, lead is distributed throughout the body by the blood serum and is found in all organs. The skeleton, however, is the only tissue in which an appreciable amount is stored, and localization in the bones is eventually practically complete. Deposition follows very closely the normal course of calcium, so one should expect to find it heaviest at the growing margins.

lead, which is very opaque to the roentgen ray, is distributed over a smaller area.

Since deposition follows chiefly the lines of growth, the breadth of the bands should give some idea of the duration of absorption.

When no more lead is being ingested, elimination takes place slowly under ordinary circumstances. As small amounts are taken up from the skeleton and circulated in the blood serum, some is excreted by way of the urinary and intestinal tracts, while some is again deposited in the developing bones. As the extremities, for instance, increase in length, the bands become broader but less dense so that by taking films at intervals one can follow grossly the course of elimination (fig. 2).

Dr. E. A. Park and his associates,[5] who were among the first to recognize the significance of the dense bands, found histologically that the bony trabeculae in these areas were more closely packed than normal and they thought that this probably explained the presence of heavy shadows.

Fig. 5 (case 3).—An abdominal film of a girl, aged 18 months, admitted on account of irritability, colic, constipation and vomiting. There was a history of pica. Blood studies showed a slight anemia but no stippling. A seventy-two hour urine specimen contained traces of lead. The flecks of dense material in the intestine are probably lead paint. Recovery was gradual and complete.

Fig. 6 (case 3).—Extremities of the same patient as shown in figure 5.

Fig. 7 (case 4).—Tibias of a boy, aged 7½ years, admitted with paralysis of the left arm which had been present since 18 months of age. This had previously been diagnosed as poliomyelitis. There was a typical story of lead poisoning and a history of much paint eating for the first four or five years of life. The prominent bony shelves are shown at the upper ends of the tibias medially, which may be the result of prolonged lead deposit in earlier life.

In a previous paper I[3] reported the results of the chemical analysis of the femur of an infant dead of lead encephalitis.[4] Sections taken from different areas of the bone showed that lead was contained in concentration four times as great in the dense bands at the growing ends as it was in the midcortex. The calcium ratio was reversed. The indications are that the dense band is due to lead and that lead replaces calcium in living bone as it does in the crushed bone experiment.

The intensity and breadth of the bands on the roentgenograms are dependent on several factors, such as the size of the child, the length of time over which the metal was being ingested, and the amount absorbed.

It requires less lead to show in the small bones of an infant than in those of a larger child because the

Other roentgenologic evidence is sometimes contained in films of the abdomen. Lead paint eaten by the child may remain for some time in the intestine and show on the films as small dense flecks mixed in with the intestinal contents.

DIFFERENTIAL DIAGNOSIS

In considering lead poisoning from the roentgenologic standpoint it is important to bear in mind other conditions that might produce a similar picture in growing bones.

A possible source of error is the heavy line of calcium deposit seen in rapidly healing or recently healed rickets.

Also, following severe nutritional disturbances, there may be heavy lines at the ends of the long bones result-

3. Vogt, E. C.: A Roentgen Sign of Plumbism, Am. J. Roentgenol. **24**: 550 (Nov.) 1930.

4. This analysis was done in the laboratory of Dr. Joseph C. Aub.

5. Park, E. A.; Jackson, Deborah; and Kajdi, Laslo: Shadows Produced by Lead in the X-Ray Pictures of the Growing Skeleton, Am. J. Dis. Child. **41**: 485 (March) 1931.

ing from retarded growth. These at times cause some uncertainty. Good contrasty films are of course important.

Phosphorus, as shown by Phemister,[6] when ingested in small amounts, produces dense bands at the growing margins of bones which are very similar in appearance to those produced by lead.

Other opaque metals, such as strontium, when absorbed may be deposited in bone but their ingestion in soluble form is very rare.[7]

The picture of "marble bones" described by Pirie [8] may have to be considered occasionally, but that is also a rare condition.

After all, one should not rely exclusively on the roentgenologic sign for, although very constant, it is not specific. In suspected cases confirmatory evidence is always to be sought, particularly a source of lead, for its removal is the most important part of treatment.

Fig. 8 (case 5).—Encephalograms of a child, aged 4 years, taken two years after the development of very severe lead encephalitis. He had been perfectly normal until 20 months of age, when symptoms of lead poisoning first developed as the result of paint eating. When these encephalograms were taken he was blind in both eyes, had a partial left hemoplegia and was mentally very defective. The widespread cerebral atrophy may be seen particularly on the right.

SUMMARY

1. Lead poisoning in children is more common than generaly suspected and may be the cause of obscure neurologic and gastro-intestinal complaints.

2. The chief source of lead affecting the health of infants and children is paint chewed from furniture, woodwork and toys. Other sources are waterpipes, nipple shields and household utensils.

3. When absorbed into the body, lead is stored in the bones and can be detected on the roentgenogram as a dense band at the growing margins. Its elimination can also be followed.

4. The roentgenologic signs are very constant but not specific and therefore confirmatory evidence is necessary.

300 Longwood Avenue.

ABSTRACT OF DISCUSSION

DR. PHILIP SYLVESTER, Boston: I don't think that the symptomatology of lead poisoning in infants is at all as clear as Dr. Vogt pointed out. A baby with lead poisoning may be merely numb "dopey," or he may have actual acute meningeal signs or, simply, indigestion. As likely as not, there is no history of lead ingestion. One gets a rather vague suspicion that that child may be in trouble from lead. A blood examination may give negative results. As far as I know, the x-ray picture in lead poisoning is not like that in any other condition. The diagnosis is therefore possible by x-rays before the story, clinical manifestations or symptomatology are definitely apparent. Dr. Vogt and I are working on another phase with another metal, which we hope will prove to be a guide in treatment in congenital syphilis. It indicates rapid absorption of a heavy metal not hitherto considered rapidly absorbable. I think that is going to be valuable.

DR. SAMUEL BROWN, Cincinnati: Did Dr. Vogt examine any of the other members of the same family living under the same conditions?

DR. RALPH S. BROMER, Philadelphia: I think that the most important thing to be obtained from Dr. Vogt's paper in the matter of differential diagnosis is the question of mild healed rickets. Hereafter one should never pass up a case as mild healed rickets merely because the child has increased width and density of the zones of temporary calcification in the roentgenograms, with clinical signs of knock knees and a mild healed rosary, perhaps a pot-belly. Hereafter one ought always to inquire into the history to make sure that one is not missing a case of lead poisoning. Dr. Vogt has added another condition which creates a wide, dense, broad zone of temporary calcification. As he mentioned, there are five or six others, but I think that the one most liable to be misinterpreted is the mild healed case of rickets. A bad case of rickets has numerous other signs, but the mild healed case with its dense zones of temporary calcification will probably get one into trouble if one overlooks the history.

DR. MERRILL C. SOSMAN, Boston: Dr. Vogt first showed me this peculiar dense line at the lower end of the radius two or two and one-half years ago, and he said that it was lead. I replied, "That is a healing rickets or the result of an overdose of vitamin D, or something else, but it couldn't be lead. With as much lead as that, the child would be dead." One of the children did die, and an analysis was made of various sections of the bone, weight for weight; but instead of an excess calcium in this broad zone at the end of the radius, the excess of lead was found and less calcium than there was in the shaft of the bone. I think that absolutely proves Dr. Vogt's contention that the line which he sees is due to the lead and not to the calcium. It is a striking example, too, of the old adage that one sees what one looks for. Physicians have not been looking for lead poisoning with any vigorous search. Now that they are suspecting it, they are finding three or four times as much lead poisoning as they found before. The ease of diagnosis of any condition is bound to affect the prevalence or the percentage of diagnosis of that condition. As Dr. Sylvester has said, the blood examination, one of the important methods of diagnosis, may be negative and is negative in a high percentage of cases. Stipple cells may be easily overlooked, and the other symptoms are often very confusing, but here is a simple and easy method of diagnosis. It is highly important to make the diagnosis early, because when one sees lead encephalitis, lead changes in the brain, the diagnosis is certainly going to be made too late. In various discussions, Dr. Bromer has named sixteen different lines in and around the epiphyseal zones. I might suggest that there are now seventeen lines.

DR. E. C. VOGT, Boston: In attempting to answer Dr. Brown's question, I shall ask you to recall the infant, aged 4 months, of whom I spoke, who had been poisoned by lead contained in the drinking water. There were three other children in the house, the oldest of whom was 7 years of age, the youngest 3. We tried to get them in for examination, but since they lived some distance from Boston, four months passed before we saw them. The lead water pipes had been removed from the home. When we saw the children there was no definite evidence of lead in the bones. I think that one must take into consideration the fact that the proportion of water intake, particularly from the home supply, was greater for the infant who was bottle fed than for the older children. Then, too, as the children begin to play outside, some of their supply comes from other sources. Of the thirty-two cases referred to in my paper, chemical analyses were done on the urine in seven, all of which showed lead. It would seem desirable to have chemical confirmation more frequently, but the difficulties are considerable.

6. Phemister, D. E.: The Effect of Phosphorus on Growing Normal and Diseased Bones, J. A. M. A. **70**: 1737 (June 8) 1918.

7. Recently we obtained films of a child who was being treated for congenital syphilis by the intramuscular injections of a bismuth compound. These showed quite dense zones at the ends of the long bones. We intend to make further observations, however, before we ascribe any definite significance to these observations.

8. Pirie, H. A.: The Development of Marble Bones, Am. J. Roentgenol. **24**: 147 (Aug.) 1930.

In the first place, it is not easy to collect from infants the five-day specimens which the analyst requests, and, secondly, the procedure itself requires time, skill and fairly elaborate apparatus.

ABSENCE OF THE CERVICAL SPINE

KLIPPEL-FEIL SYNDROME *

GEORGE I. BAUMAN, M.D.
CLEVELAND

Anomalies in the cervical spine are uncommon; especially rare are those described under the obscure term of the Klippel-Feil syndrome. This consists in a numerical variation in the cervical vertebrae with more or less complete fusion into one mass, accompanied in some cases with spina bifida or other anomalies. Although the condition had been described before, it was first presented in detail by Klippel and Feil [1] in 1912 and on this account has been referred to as the Klippel-Feil syndrome.

About thirty such cases have been reported, mostly in the French literature. Three cases have been reported in America and one in England. The French refer to it as "les hommes sans cou," the Germans as "kurzhalz." In this report six cases, one male and five female, will be presented. It occurs in males and females about equally. In an examination of 2,000 skeletons in the Department of Anatomy of Western Reserve University School of Medicine, no case of Klippel-Feil syndrome was found, although other cervical anomalies were encountered.

The first case reported by Klippel and Feil furnished the only anatomic specimen. In this case there were only four "cervical" vertebrae, fused into a mass and resembling dorsal vertebrae. In all there were twelve vertebrae instead of the usual twenty-four.

Fig. 1.—Very short, broad neck with low hairline in case 1.

In studying the morphology and anatomy of this condition, the development of the posterior part of the skull must be considered, especially in relation to certain symptomatic manifestations present in four out of six of the cases included in this report. If, as is claimed by many anatomists, the occiput corresponds to the fusion of four cervical vertebrae, then the fusion of another cervical vertebra (the atlas) to the occiput may be a manifestation of further evolution. Dwight, however, maintains that this is not a progressive or a reversive manifestation, but, if the whole spine is studied, other developmental modifications may be found to correct the error in the cervical region. In the Klippel-Feil syndrome there is more than a simple fusion of the atlas to the occiput. There is a marked diminution in the number of the cervical vertebrae and those remaining are altered and fused into a bony mass.

Although nerve lesions are very rare, the question has been raised as to the original lesion being in the nervous or in the osseous system. The possible nervous origin of this condition is suggested by the fact that patient 2 is mentally deficient and also has a nervous symptom which is present in three other cases. Paralysis of certain eye muscles noted in several patients also points to a nerve lesion. The absence of certain foramina of exit of spinal nerves should lead to various nervous disturbances, but these have not previously been noted.

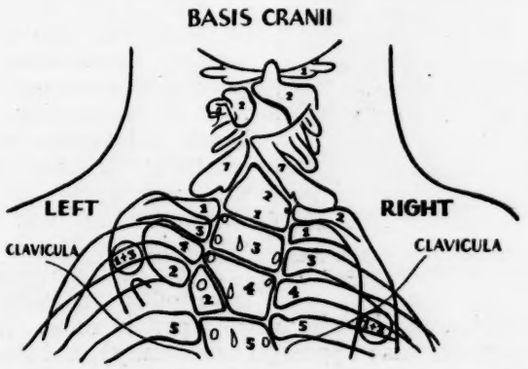

Fig. 2.—Using a number of roentgenograms made from different angles, Dr. Bettelheim has attempted to show in a sketch the various elements of the cervical spinal deformity in case 1.

In cases 1, 2, 3 and 5 there is an inability to dissociate the movements of the two hands. Any movement performed by the right hand is copied more or less accurately by the left. This was present from birth and was still present in patient 1 at 14 years of age. This phenomenon, which has been designated as mirror movement, was also reported in an aunt and cousin of one patient (patient 3), but these relatives had no noticeable spinal anomalies.

As no anatomic specimens are available, one may only speculate as to the probable location of a lesion which could produce such symptoms. As this symptom is present occasionally in certain lesions in the corpus striatum, it may indicate a developmental defect in this region. An abnormal decussation of the pyramidal tract has also been suggested as a possible cause; against this is the absence of paralysis and change in reflexes. This symptom was found so constantly in this series of cases and is so rare in other conditions that it seems reasonable to conclude that it was overlooked in many of the other reported cases and should be included in the symptom complex of this condition.

There is often a spina bifida and yet it is doubtful whether any of these cases should be classed with those of anencephaly with or without spina bifida. These monsters are usually stillborn. The cases of Klippel-Feil syndrome are frequently normal in every other way. Feil thinks that when there is a spina bifida this is the first defect and is followed later, possibly on account of trauma, by fusion of the pieces of vertebrae. The changes are all intra-uterine. A developmental anomaly primary in the nervous system with an accompanying or resulting bony anomaly may be assumed in at least a large percentage of these cases.

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* Read before the Section on Orthopedic Surgery at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 10, 1931.

* Owing to lack of space, this article is abbreviated in THE JOURNAL by the omission of a bibliography, which will appear in the author's reprints. The author will send a reprint of the complete article, on request.

1. Klippel, M., and Feil, André: Un cas d'absence des vertèbres cervicales, Nouv. iconog. de la Salpêtrière **25**: 223, 1912; Anomalie de la colonne vertébrale par absence des vertèbres cervicales—Cage thoracique remontant jusqu'à la base du crâne, Bull. et mém. Soc. Anat. de Paris, 6th series **14**: 185, 1912.

The studies by Dwight, Smith, Gladstone and Wakeley, Froriep, and others are on cases of simple fusion of one, two or three of the upper cervical vertebrae and not of absence of the cervical vertebrae. There is little in common between these and the Klippel-Feil cases. The former may be due to progressive or regressive changes, the latter may be due to some disease or diminished vitality in the germinal cells; an unstable condition induced by a weakening of certain hereditary powers, leading to a disturbance in the mesoderm or in the segmentation of the embryonal skeletal axis.

Fig. 3.—Moderately short broad neck with low hairline in case 3.

Changes in individual muscles have been noted. Muscle spasm or an almost constant contraction of the cervical muscles was noted in two patients (1 and 2) and explained on the assumption that the muscles must take the place of the osseous system in supporting the head. Disturbance of breathing or swallowing was not noted in the literature but was observed in case 1.

Many of these patients have other anomalies or deformities, and heredity plays a part in some. Some have high scapulae (Sprengel's deformity), and the two conditions may readily be confused.

Torticollis is commonly present but not marked. In at least eight of the reported cases, a myotomy has been done for congenital torticollis without, of course, any benefit. This operation had been advised in two cases (2 and 3). Some were diagnosed and treated as vertebral tuberculosis. This resemblance is striking in some cases, especially since satisfactory roentgenograms are difficult to obtain and interpret; but presence of true muscle spasm, a kyphos, signs of infection, and the like should differentiate the two conditions.

The neck is so short that the thorax almost reaches the head, Klippel and Feil referring to this as the "cervical thorax."

PROGNOSIS, SYMPTOMS AND TREATMENT

The deformity remains stationary and is not affected by any treatment. It is disguised with difficulty and unfortunately does not become much less conspicuous as the patient develops. The mirror movement, when present, does become less noticeable but does not disappear. The deformity does not interfere with longevity.

The classic symptoms, as given by Klippel and Feil, are (1) absence or shortening of the neck, (2) lowering of the hair line on the back of the neck and (3) limitation of motion. Other symptoms occurring in a certain percentage of cases are: torticollis, mirror movement, facial asymmetry, dorsal scoliosis, other deformities, difficulty in breathing or swallowing, and shortness of breath.

No treatment is of any benefit. Operations, as for congenital torticollis, or active treatment, as for Pott's disease, should be avoided by making a correct diagnosis.

REPORT OF CASES

CASE 1 (figs. 1 and 2).—H. H., a girl, aged 23 months, first examined, Nov. 7, 1918, because of a deformity of the neck, presented a family history negative for any similar deformity. The deformity was present at birth. She had a difficult birth, one month overdue. The deformity has not changed much since birth. Breathing was "heavy" the first few weeks and never has been normal since then. The patient was blue for a short time after birth and was not expected to live. Her general health was good. The bowels were constipated. She slept and ate well.

The patient appeared normal except for the deformity and breathing; she breathed as though there were an obstruction in the nose or throat. She held the head forward and a little to the right. The neck was very short. The spinous processes were difficult to feel but there was a slight prominence in the midcervical region with some depression just above this. Motions were fairly free and painless. Roentgenograms taken at the time of the first examination were not entirely satisfactory but seemed to show a spina bifida, also a cervical rib coming down from the middle or upper cervical region on one side. The patient was awkward in the use of her hands and it was impossible for her to use one hand without copying the movements with the other.

Aug. 30, 1928, the patient, at the age of 11, was in the sixth grade and her mentality was above the average. Her breathing was still difficult, especially when lying down. The neck was very short. Movements were decidedly limited. The neck was also very broad and this was at least partly due to unusually large cervical muscles, which remained in more or less constant contraction to hold up the head. She had good strength in the hands and arms. Mirror movements were still present but less marked.

Feb. 3, 1931, when the patient was 14 and in the eighth grade, there was very little improvement in the deformity of the neck. The mother said that she tired after holding the head up for some time. If she could, she would rest it on the chest. Mirror movements were still present but not pronounced.

Roentgenograms were taken by Dr. Frederick Bettelheim, February 4. In figure 2 he has attempted to show the various anomalies. His conclusion was as follows: The observations

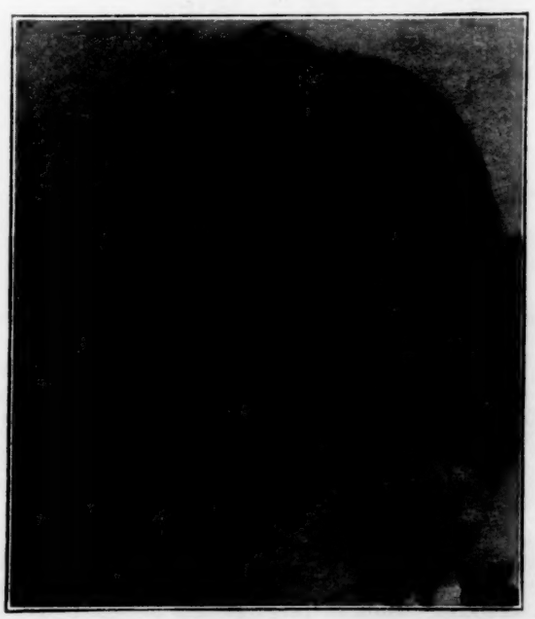


Fig. 4.—Very short broad neck with low hairline in case 5.

are evidence of a grave malformation of the entire cervical and the upper thoracic spine and also some of the ribs (Klippel-Feil syndrome). There is a numerical reduction, underdevelopment, fusion and spina bifida of the entire cervical spine (with the possible exception of the atlas). There is a scoliosis of the upper thoracic spine, misplacement of the two halves of the second thoracic vertebra, fusion of the first thoracic and the right half of the second thoracic vertebra, and underdevelopment and fusion of the two ribs of the first thoracic vertebra. The number of the ribs and also of the vertebrae of the thoracic and lumbar spine are normal.

This is the oldest and most typical case in the series. It is therefore reported in more detail than the other five.

CASE 2.—C. E., a girl, aged 14 years, was first examined, Oct. 15, 1926, because of a crooked neck. Her family history was negative for any similar deformity. She had been a full

Fig. 5.—Spina bifida, fusion of lateral masses, and numerical variation in case 5.

term baby with a normal delivery. She had been late in learning to sit and walk; she had always been deaf. For many years the patient could not move one hand without a similar movement in the other. She had always been backward mentally. The head had been held to the left side and the neck had always been short. An operation for wryneck had been advised.

The patient appeared considerably below par mentally. She walked fairly well and held the head forward and to the left, resting almost on the chest. The cervical muscles were more or less constantly in action. There was a little right cervicodorsal curvature and almost complete obliteration of the cervical lordosis. No spina bifida could be felt but the neck appeared short and broad. The patient used the hands quite well and apparently had control of each individually. Apparently there was no spasticity in the arms or legs. The reflexes were normal. There was an internal squint in the left eye.

Roentgenograms showed what appeared to be an anterior displacement of the atlas on the axis or an anterior displacement of the skull on the atlas. There was considerable deformity of several of the vertebrae and there appeared to be a definite spina bifida of the fifth and possibly of the third cervical vertebra.

CASE 3 (fig. 3).—E. P., a girl aged 2 years at the time of the first examination, March 10, 1928, held the head to the left side. A cousin and one aunt were below par mentally and were reported to have mirror movements without any noticeable deformity of the neck.

The patient had had a normal birth. Development was normal except that the mother had noticed that she held the head over to the left shoulder. She was a little late in learning to hold up the head and to sit and walk. There was no limp but she staggered at times in walking and fell frequently. She had no trouble with breathing or swallowing. She talked plainly and understood perfectly. An operation for wryneck had been advised.

The patient appeared normal except for the short, broad neck and the torticollis. The cervical muscles were fairly tense and there was some limitation of motion in the neck. The patient was apparently right handed but copied the movements of one hand with the other. There was no spasticity. She walked well but went up and down steps one at a time.

March 27, 1931, when the patient was 5 years old, she was mentally above the average. The mirror movements were very pronounced. The left arm movements at times showed some athetosis.

Roentgenograms showed the cervical spine displaced to the right through a scoliosis with its maximum curvature at the level of the seventh cervical vertebra. Seven vertebrae of the cervical spine could be distinguished with fusion of the bodies of at least five of these. There were fairly normal intervertebral disks between two fused masses of cervical vertebrae and between the fifth, sixth and seventh cervical vertebrae. Arches and spinous processes of the second to the sixth cervical vertebrae were fused in one irregular mass. There was no spina bifida.

CASE 4.—A. I., a girl, aged 6 years at the time of first examination, Jan. 19, 1931, had a deformity of the neck. Her family history was negative for any similar deformity.

The neck had been short since birth. There had been no injury. She had no difficulty in swallowing or breathing. The mother said that there had been some duplication of movements in the hands.

The patient's nutrition and general development were about normal for her age. She appeared to have slow mentality. Her gait was normal. There was some torticollis. The neck was short and broad. The hairline was low on the neck. There was moderate limitation of motion in all directions. An internal squint was noticeable at times.

Roentgenograms showed, besides the atlas and the axis, only three vertebrae in the cervical region, the bodies of which were about equal in size and separated by well developed intervertebral disks; there was a numerical reduction of the cervical vertebrae without fusion, spina bifida or other deformity.

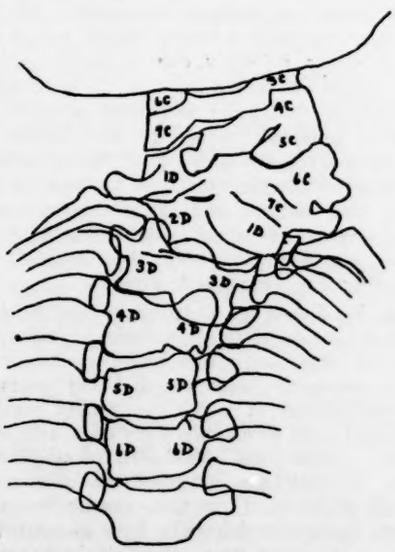


Fig. 6.—A sketch of roentgenograms in case 6 made by Dr. Merthyn Thomas in an effort to show the arrangement of the various anomalies.

CASE 5 (figs. 4 and 5).—C. B., a boy, aged 4 years, whose case is reported through the courtesy of his physician, Dr. C. T. J. Dodge, had a short neck. The family history was negative except that one sister died at 6 months; she had had exstrophy of the bladder and collapse of the rectum, but no head or neck deformity.

The patient appeared normal except for the peculiar hand movements and the deformity of the neck. The neck was very short; there was limitation of motion, moderate torticollis, and a low hairline. There were marked mirror movements in the hands. The patient could not turn either eye outward.

Roentgenograms showed apparently only about four vertebrae, which were divided roughly into two laterally fused masses. This left a rather large opening in the center (spina bifida). There was also a lack of union of the neural arch in the upper thoracic region.

CASE 6 (fig. 6).—H. B., a girl, aged 5 years at the time of the first examination, May 29, 1931, had a deformity of the neck. The family history was negative for any similar deformity.

She had been a full term baby with a difficult labor. She learned to walk and sit at about the usual time. The short thick neck was noticed at birth. The general health had been good and her development normal except for the neck.

The patient was unusually active and appeared mentally above the average. She was right handed and did not have mirror movements. She had had no trouble with breathing or swallowing. The neck was unusually short, very wide, and had a very low hairline. There was a rather pronounced left cervicodorsal curvature. The muscles were hard and contracted. There was marked limitation of lateral bending and rotation but very little limitation of flexion and extension.

Roentgenograms were taken by Drs. Hill and Thomas. The arrangement of the various anomalies is best understood by a reference to the sketch made by Dr. Merthyn Thomas (fig. 6).

Osborn Building.

ABSTRACT OF DISCUSSION

DR. EDWIN W. RYERSON, Chicago: When I read the title of Dr. Bauman's paper, I thought that I had never seen a case of the Klippel-Feil syndrome because the title presupposes an absence of the cervical spine. In Dr. Bauman's roentgenograms, however, the cervical spine is not absent and the title of the paper is not descriptive or applicable. The cervical spine is present, and it is very much deformed by anomalies. I have seen only three of these cases in thirty-two years, and in all of them the conditions were present as in the pictures that were shown, but I had never noticed or heard of the mirror movements; I think this is a distinct contribution to the symptomatology, although there is no reasonable explanation as to the causation of these synchronous movements. In the patients that I have seen, the neck was very broad, and in one boy the apparent width was evidently due to the trapezius muscles, which were spread out to the point of the shoulder, were thin and prominent, and produced an almost winglike appearance of the neck. I operated on this boy and divided these outer portions of the two trapezii with a good deal of cosmetic benefit. I do not know of anything that can be done in these cases. None of my three patients were at all mentally deficient and the mirror movements were not noticed; I will attempt to find these children who are now, two of them at least, well grown, and see whether this symptom is present.

DR. CARL E. BADGLEY, Detroit: I am indebted to Dr. Bauman for the name of this syndrome. I have seen two of these cases and didn't know just where to classify them. My impression in seeing the cases was that they resemble cases of mild craniorachischisis in which the patient survived, and I believe we shall have to classify them as a mild form of that malformation. There must be all sorts of stages to reach the final stages. I think that many of the cases now reported belong in this division. I am quite certain that many of the patients with Sprengel's deformity have associated a Klippel-Feil syndrome of a mild type. It would be interesting to see how many cases of Sprengel's deformity show abnormalities of the cervical vertebrae. It is recognized that spinal bifurcation occurs frequently in Sprengel's deformity, but in relation to cervical anatomic absence no one has made a report. Since Dr. Bauman wrote me concerning the mirror movements, I have examined our patients with hemiplegia and they all demonstrate them. I looked up the literature and in Stewart's textbook there is a note that it is very common to see these conjugate movements occurring in spastic hemiplegia or diplegia, and he says that they are really tonic reflex reactions, the same as in decerebrate animals. They are reflex movements in the muscle tone and not movements in the strict physiologic application of the term.

NORMS OF REFRACTION *

EDWARD JACKSON, M.D.
DENVER

Norm is defined as: "A rule or authoritative standard: a model, a typical example." It is a changed form of the latin "norma," a builder's rule or square, being thus allied to the word normal. It has been used about seventy-five years by mathematicians, who employed "norms" to simplify some of the problems of higher algebra. It has been adopted in law, a norm being a typical case that implies a certain judgment and, by comparison with which other cases, not exactly like it, could be judged. Norms, standard units, have also been recognized in some departments of biology. The expectation of life at any age, and the average length of life for the whole community, are norms, worked out mathematically for life insurance companies by general averages.

Other such averages, that serve as norms, are the pulse rate, used for two thousand years, its relations to number of respirations: the relation of height to weight, and of both to age; the normal relation of diets to work and weight; and other averages that are used in solving the problems of body health. In ophthalmology Duane [1] wrote on the "Norms of Convergence," including the relations between convergence adduction and convergence distance, the maximum of convergence at different ages, and the value of meter angles for various interaxial distances. The work of Donders [2] and of those who followed him in studying relative accommodation and relative convergence, studies of retinal adaptation, of relation between macular visual acuity and perception, of thermal death points and of ocular fatigue, are all directed to the determination of norms.

Norms generally are typical, or average, anatomic and physiologic conditions, as average skull capacity, brain weight or pulse tracings, which must be determined as starting points, from which anomalous pathologic departures can be understood and estimated and to return to which the therapeutic measures must be adapted and directed. Norms are needed for conditions that are pathologic. A norm for the development of senile cataract would destroy false hopes and ungrounded fears. It would add to the effectiveness of ophthalmic treatment, in dealing with these pathologic conditions. Because there are no norms for hypertension and angiosclerosis, focal infections, and glaucoma, knowledge of them remains fragmentary, indefinite and confused.

The refraction of the eye, because of the mathematical relations in optics, the accessibility of its changes to observation, the developed methods of studying it, the long period through which it can be studied, and its importance through human life, is a subject about which norms should be established with broad observation and exactness. The visual acuity of any eye is not known until its refraction has been determined; and all that can be learned by tests of visual acuity remains uncertain until the influence of imperfect optical adjustment has been eliminated.

Norms of refraction are so important that they have been assumed or accepted on the observance of a few

* Read before the Section on Ophthalmology at the Eighty-Second Annual Session of the American Medical Association, Philadelphia, June 12, 1931.

1. Duane: Contributions to Ophthalmological Science, 1926, p. 34.
2. Donders: Accommodation and Refraction of the Eye, 1864.

eyes. But they will be exact and useful only when the averages and changes have been noted for a great many. The records of a great city clinic, or the facilities of a university laboratory, are worth very little in seeking such norms. They must represent the results of a large number of clinical observations, made with care, by established methods, over long periods. The return of clinic patients is so uncertain and irregular that very little can be learned from them in such an investigation.

One reason for publishing this study is to show that it can be carried on by a single ophthalmologist, even by one practicing in an isolated community, where one is more likely to have the same patients return over long periods. Norms cannot be said to be fully established until they represent the consensus of many observers and are based on data obtained from many patients. Duane, to show the normal converging power, gave five tables, each including observations of many (from 108 to 987) patients. J. H. Knapp's [3] first paper on curvature of the cornea was based on the study of four eyes. The schematic eye of Listing,[4] modified by Helmholtz, Donders, Gullstrand and others, was based, as were each of the modifications, on relatively few eyes. Such studies could not establish norms but they brought out definite suggestions that helped to the understanding and solution of certain problems of physiologic optics. For such purposes they will always be interesting and useful.

Norms should have a broader basis and will have wider application. They are of more than merely academic interest. Those that have been here studied, by the statistical method, suggest answers to some questions that have arisen in the minds of many ophthalmologists, or have been tossed about in discussions regarding methods of ophthalmic practice. What is the ideal refraction for the human eye among civilized people? Does hyperopia decrease at one period of life and increase at another? Is myopia a progressive step in the evolution of the eye of the future? Does the wearing of lenses, correcting ametropia from early life, modify the nutritive processes that tend to lessen refractive defects; or does such a correction help to preserve vision to old age?

To know the norms of refraction will help one to understand the relations of refraction and accommodation, of static and dynamic refraction. It will give new significance to relative accommodation and relative convergence. With a more sufficient basis one can carry forward the work of Donders, Derby,[5] Duane and Stutterheim [6] to better understanding of the basis and essential nature of what has been called "eyestrain."

SPHERICAL REFRACTION

Spherical refraction has been the chief problem considered, in the extension of vision and improvement of illumination by optical instruments. Defective spherical refraction of the eye—myopia, and the deficiency that comes with age—were recognized and roughly corrected for hundreds of years before astigmatism was known. But approximate norms for the spherical refraction of the eye are not yet established, more than 300 years after Kepler laid the foundation for physiologic optics. The observations that furnish a basis for these norms have been made in private practice, on members of the mixture of European races found in an American city and the newly settled country contributary to it. They were made on eyes that had been used for vision in many occupations and pursuits. Eyes damaged by serious injury or by disease that would alter the refractive surfaces, such as conical cornea, phlyctenular disease, trachoma or severe uveitis, were excluded. No eye was considered that had developed alone, after loss of its fellow.

The data were taken and recorded in deciding on the need for glasses. Cycloplegia was used, generally in persons seen before 40 or 45 years of age, and sometimes in later life. The ophthalmoscope, ophthalmometer, skiascopy and the best subjective methods were used in the measurement of refraction or in testing the acuity of vision after correction of ametropia. The average spherical refraction was obtained as an average of the refraction of the two principal meridians of regular astigmatism. Thus, an eye requiring a lens of + 1. sph. with a + 2. cyl.: that is, + 1. in one meridian and + 3. in the other, was counted as having 2 diopters of average hyperopia. One needing + 2 S. with a — 5 cylinder would have 0.50 diopter of average myopia. To estimate the spherical refraction by the strength of the spherical lens, disregarding the cylinder added to it, would give a false idea of the refraction, which depends on the relation of the anteroposterior diameter of the eyeball to the curvature of its refracting surfaces. Data taken in any other way would leave in confusion all questions of relations between spherical and astigmatic refraction.

Norms representing the usual changes of refraction of the human eye, throughout life, could be obtained by comparing records of refractive changes in a sufficient number of patients, under observation from early childhood to old age. But such records are nowhere available. The complete study of such records as have been obtained of private patients, particularly those who have returned to get their refraction retested over several years, will give the best approximation to the desired norms of refraction. When a sufficient number of such studies, made independently, have been obtained with the best methods of studying refraction and with a care commensurate with the supreme importance of accurate correction of refractive errors, static and dynamic, there will be a basis for a philosophy, or theory of the correction of refractive errors that will free both the medical profession and the public from the dangers of plausible assumptions by spectacle salesmen, whether they call themselves optometrists or doctors.

This paper is a collection, from the case records of thirty years, of data bearing on each norm sought. The cases have been divided into age groups. During the period of chief development, before 20 years, the groups cover five years each; from 20 to 60 they are in ten year periods, and all above 60 years—the period of physical involution—have been grouped together. In the first group, two of the eyes were emmetropic; six had hypermetropia of 0.50 diopter each. In the other eyes the hyperopia ranged up to 8.50 diopters, in each eye of a boy of 3 years and 7 diopters in each eye of a boy of 4 years. There was no myopic eye among them. Of the patients, eighteen were brought for convergent strabismus, one for divergent strabismus, with hyperopia of less than 0.50 in each eye, three for nystagmus and one for albinism. The forty-three hyperopic eyes averaged 3.07 diopters of error, each. Apparently, under 5 years of age the children were

3. Knapp, J. H.: Arch. f. Ophth. (Graefe's) **8**, pt. 2, p. 108.
4. Listing, in Helmholtz: Physiologic Optics **1**: 94, 152, 351.
5. Derby: Tr. Am. Ophth. Soc. **2**: 139, 1872.
6. Stutterheim: Indications for Kinetic Treatment of Eyes, Brit. J. Ophth., supp. 5, 1931.

brought only for striking ocular defects, and the high average hyperopia was connected with the strabismus for which the child was brought. A larger group, obtained in some other way, would be necessary to obtain a norm or average for the ocular refraction of such young children.

The next group, from 5 to 10 years old, represented much more closely the average ocular refraction of children. The youngest patient with myopia encountered was between 5 and 6 years old and required — 10.50 D. sph. ⌒ — 1.50 cyl. for the correction of each eye. His parents said that he held things very close from infancy, and they were both myopic. At from 5 to 10, under compulsory school attendance, practically all children are starting into school and are about as likely to discover effects of errors of refraction then as at any period of later life. The results of the studies at this and later periods of life are presented in condensed tabular statements.

TABLE 1.—*Spherical Refraction*

Age	Cases	Hyperopic Eyes		Myopic Eyes		Emmetropic Eyes	
		Number	Per Cent	Number	Per Cent	Number	Per Cent
Under 5	25	48	96	..	...	2	4
5 to 10	227	393	86.3	37	8.1	24	5.6
10 to 15	414	605	73.1	133	16.1	90	10.8
15 to 20	611	777	63.6	314	25.7	131	10.7
20 to 30	1,482	1,987	66.7	560	19.6	407	13.7
30 to 40	1,632	2,298	70.4	560	17.2	406	12.4
40 to 50	1,769	2,568	72.6	492	13.7	488	13.7
50 to 60	1,101	1,492	67.8	384	17.5	324	14.7
Over 60	777	1,117	71.8	296	19.1	141	9.1
Totals	8,013	11,285		2,796		2,011	

All eyes the average of whose meridians showed less than 0.50 D. of hyperopia or of myopia are classed as emmetropic. This practical emmetropia gives a more useful norm than would exact emmetropia, a theoretical condition rarely encountered. Such practical emmetropia includes many cases of mixed astigmatism, with the hyperopic and myopic meridians almost equally balanced. An eye choosing + 3. cyl. axis 90° with a — 3. cyl. axis 180° would be set down as emmetropic, as it would be as to spherical refraction. This may seem surprising; but it is the way such cases must be thought of if one is to think clearly about the relations of spherical and astigmatic refraction.

TABLE 2.—*Hyperopia: Averages and Extreme Cases in Various Periods*

Age	Eyes	Average	7 D. or Over	Highest
Under 5	48	3.07 D.	2	8.50 D.
5 to 10	393	1.95	13	8.50
10 to 15	605	1.51	8	10
15 to 20	777	1.20	8	8
20 to 30	1,987	1.27	19	9
30 to 40	2,298	1.29	10	9.50
40 to 50	2,568	1.45	20	10
50 to 60	1,492	1.53	9	9.50
Over 60	1,117	1.80	9	10
	11,285		98	

Study of the age distribution of hyperopia and myopia must include, with the number of cases occurring in different periods of life, the average degrees of errors of refraction at the different periods. The numbers and percentages of these forms of ametropia, with the average amount of refractive error in each period, are shown in table 2, with the cases of exceptionally high error, 7 diopters or more of hyperopia, and 10 diopters or more of myopia, and the highest degree encountered in each period.

The striking thing about the column of averages for hyperopia is the high figures with which it begins, 3.07 diopters for the children under 5 years of age. This might be thought to favor the assumption that all infants' eyes begin with hyperopia, which generally decreases during childhood and youth. These statistics do not give any certain support to this hypothesis. There were only twenty-five of these patients, and these were brought at this very early age because of the defects of their exceptionally high hyperopia. Of this group seventeen had convergent strabismus. The thirty-four eyes of the squinters averaged slightly higher than the whole group, although among the others were two cases of nystagmus and one albino, whose hyperopia, in six eyes, averaged over 5.75 D. Donders gives two tables to illustrate the connection of hyperopia with convergent squint. But of the twenty-one patients the youngest was 9 years of age, and only ten of them were under 20 years old. Worth's [7] statistics of hyperopia and squint show that by far the larger number of patients having convergent squint have hyperopia of from 2 to 5 diopters. He tried to disprove the etiologic relation of the hyperopia by the refraction of series of children that had similar amounts of hyperopia with and without squint. He showed that not all children who have that much hyperopia have squint; but the inference that hyperopia does not cause squint was entirely unjustified. More extended statistics show that convergent squint is almost confined to those who have hyperopia of near this amount, and these are but a small minority of all the hyperopic children.

TABLE 3.—*Myopia: Averages and Extreme Cases at Various Periods*

Age	Eyes	Average D.	10 D. or Over	Highest
Under 5	0	....	..	..
5 to 10	37	3.34 D.	6	18
10 to 15	133	2.79	6	15
15 to 20	314	2.88	11	20
20 to 30	580	2.27	13	15
30 to 40	560	2.93	24	18
40 to 50	492	2.92	29	19
50 to 60	384	3.23	28	26
Over 60	296	3.57	28	20
	2,796		145	

It is certain that in the second period, from 5 to 10 years, and in the third, from 10 to 15 years, there are still enough cases of high hyperopia included to raise the general average amount materially. A boy of 3 years was first seen for sick headaches with vomiting that did not yield to general treatment. Correction of his hyperopic astigmatism R + 8. ⌒ — 1. cyl.; L. + 7. ⌒ — 0.50 cyl. relieved him entirely. At the age of 10 he required R. + 10. ⌒ — 2.25 cyl. L. + 10. ⌒ — 2.50 cyl., a slight increase of hyperopia. A child with unusually high hyperopia, even if he has no squint or nystagmus, is pretty sure to have trouble from it in early school life and thus come to the attention of the oculist earlier than one who has only a moderate amount of the defect. This is the rational explanation of the decrease in average amount of hyperopia, up to 20 years.

After 20 there begins a slow increase of average hyperopia that continues until old age and has been noticed by many observers, although not broadly studied, as a general tendency of all hyperopic eyes. Such an increase of hyperopia has been best explained by Priestley Smith [8] as simply the result of the growth

7. Worth: Squint, pp. 43 and 45.
8. Smith, Priestley: Glaucoma, p. 85.

of the normal crystalline lens, which, he demonstrated, occurs up to the age of 65 years, in harmony with the continued growth of other structures of epiblastic origin throughout the body. The general gradual increase of hyperopia is well shown for the 11,285 hyperopic eyes here studied.

The statistics regarding 2,796 myopic eyes and their age distribution show several important points that bear on the etiology and management of myopia. The absence of myopia, in any case seen before 5 years of age, simply illustrates how rare it is in early childhood, a point on which different observers agree. But such cases do occur. I have seen a case of high myopia and marked fundus changes at 4 years of age. The case of a child who had high myopia of 11 diopters in both eyes before she was 6 has been mentioned. There can be no reasonable doubt that this case was congenital. Other such cases, some congenital, explain the high average of myopia for the periods before 20 years of age. After 20, however, the average amount of myopia continues to increase. This is probably owing to the tendency of myopia to increase when correcting glasses are not constantly worn and care is not taken to keep the eyes sufficiently far from near work. In other words, the excessive convergence which, in the great majority of cases, starts the myopia and keeps it progressive, still operates.

A striking instance of this is seen in the case of a man who had, all his life, been a great student, reader and writer. He did not like to wear glasses, as he confessed, "on account of vanity." At 18 he had picked up a pair of glasses, which he wore only for distant vision and for a few minutes at a time. At 25 he consulted a physician who prescribed glasses, but they were worn very little. At 35 he consulted an eye physician, who gave very weak glasses and advised that they be changed every six months. But at no time in his life have glasses been worn for more than a few minutes at a time, for distant vision, and he stated that he had no symptoms except poor sight. At over 50 years of age, the correcting glasses required were:

R. — 25. D. sph. ⊃ — 2. cy. axis 30° V = 0.2
L. — 20. D. sph. ⊃ — 2. cy. axis 130° V = 0.4

Binocular vision, or diplopia, was easily suppressed and probably had been used, or experienced, very little for many years.

All the cases that have continued progressive under this care, during the last thirty years of private practice, have been reported in a paper published in the *American Journal of Ophthalmology*. These cases are included in table 3 and may account for the slight increase of amount of average myopia between 20 and 50 years of age. The increase of myopia after the age of 50 is pretty certainly due to changes in the crystalline lens, which are common in myopic, as in hyperopic and emmetropic eyes, at such an age. They have been referred to in other papers.[9] Although known for hundreds of years as "second sight" the norms of this form of senile myopia have never been worked out, and they are worthy of detailed study by many observers, as are those of so-called emmetropia.

It is to be hoped that some study of the norms of refraction will dispel the fancies and superstitions perpetuated from the days of ophthalmic ignorance that still linger, even in books that purport to treat of "modern" ophthalmology. All cases of myopia are "progressive" at the start and cease to be so when the conditions that produce myopia are removed. The cases that have been called "pernicious" were only the cases untreated, or badly treated, until degenerative changes had advanced so far that it was very difficult, perhaps impossible, to check them. The terms "progressive" and "pernicious," or "malignant" myopia have been sources of confusion and reasons for abandoning "to their fate" cases that were not understood. They should be banished from use, because they indicate no definite class of cases to be recognized clinically and hinder recognition of what may be important causative factors of myopia; although probably such factors determine the final result in a very small proportion of cases.

9. Jackson, Edward: Tr. Am. Acad. Ophth. & Oto-Laryng., 1928, p. 33; Tr. Am. Ophth. Soc., 1930, p. 223.

REGULAR ASTIGMATISM

Thomas Young, discovering astigmatism in his own eye, determined that it was due to asymmetry of his crystalline lens and not of the cornea. Airy got his own astigmatism corrected, without deciding which of the refracting surfaces of his eye was at fault. When Helmholtz had worked out his ophthalmometer, those who became interested in astigmatism, Knapp, Donders, Doijer, Middelberg and others, studied the curvatures of the cornea with it and found these curves different in different meridians in a way that would cause astigmatism in a large proportion of cases. When Javal and Schiötz had modified the ophthalmometer so that it could be used for the clinical study of ocular refraction, it was found that the correspondence of astigmatism with the corneal curvatures was not very close or constant and that in some cases the disagreement was very great. This led to the practical recognition of the influence of the lens on astigmatism.

Empirical rules were suggested for calculating the total astigmatism from that of the cornea; but these have been so imperfect, and often misleading, that the instrument they were intended to make more practical and widely useful has fallen into comparative disuse. While considerable study has been given to the subject and statistics have been published, there has not yet been sufficient statistical basis for norms of regular astigmatism, corneal, lenticular or total. For such basis the data obtained by the ophthalmometer for corneal astigmatism can be used, and the data obtained by other methods, skiascopy and subjective methods of measuring refraction, for the total astigmatism of the eye. But the only practical method of estimating the lenticular astigmatism in large numbers of clinical cases is by comparing the total with the corneal astigmatism.

This has been followed in seeking the norms for regular astigmatism in the human eye. It accepts the assumption of Thomas Young that, when the corneal refraction was eliminated by placing the cornea in water, the surfaces of the crystalline lens were the only ones capable of causing the phenomena in question. Other possible factors have been suggested, as asymmetry of the posterior surface of the cornea. But this would not account for the astigmatism. Asymmetry in the layers of the lens, and the surfaces bounding them, and obliquity of the lens to the visual axis, are more probably effective. But about these so little is known that the practical thing to do is to call all regular astigmatism, not accounted for by the corneal surface, "lens astigmatism." When norms have been determined for it as a whole, ophthalmologists will be in better position to learn of its possible varieties and refinements.

The norms next taken up in the paper are those for corneal and for lens astigmatism, as to frequency,

extent, interrelations and variations at different periods of life. It is already known that astigmatism corresponding to corneal curvatures, so-called astigmatism with the rule, is the common kind only in early life, and that late in life the regular astigmatism conforms to the corneal curvatures in only a diminishing minority of eyes. It has seemed practical, therefore, to seek the norms of astigmatism in the two periods before 25 years of age and after 50 years. The period between these two is a time of change for which it would be very difficult to determine norms until more changes in single cases have been observed. It will be easier to find such norms after the norms here attemped have been corrected and confirmed.

As a scientific objective, exact determination of the principal meridians of astigmatism should be aimed at. But the methods by which they have been determined clinically, the distortion by which the meridian is judged with the ophthalmometer, and the various subjective tests for the direction of the meridians that are commonly relied on, and the direction of the light and shadow in skiascopy, are so loosely approximate that only an approximate norm of meridians can be hoped for. The most practical plan seems to be the following: The direction of the meridian of greatest curvature for the cornea, or the greatest refraction for total astigmatism, was the only meridian dealt with throughout. This would be the direction of the axis of a convex cylinder, and at right angles to the direction for the concave cylinder axis correcting the astigmatism.

TABLE 4.—*Direction of Meridians of Astigmatism*

	No Astigmatism	Horizontal	Vertical	Oblique	Total
Corneal astigmatism					
Before 25.....	52	24	910	32	1,018
After 50.....	84	118	737	86	1,005
Lens astigmatism					
Before 25.....	62	817	61	52	992
After 50.....	72	726	63	163	1,024

Three zones are recognized in which the meridian might fall: Vertical, the direction usually designated as 90 degrees and within 30 degrees on either side. Horizontal, perpendicular to the vertical, and to 30 degrees on either side of the horizontal. Oblique, the zone between the other two. Thus all meridians between 60 and 120 degrees, that is, from 61 to 119 degrees, are counted vertical. All between 30 and 150 degrees and toward the horizontal are counted horizontal; and those from 30 to 60 degrees and from 120 to 150 degrees, including those meridians, are counted oblique. This seems a loose kind of mathematical statement but it is the plan that gives the best grasp on the observed facts. The slight inaccuracies of individual observations tend to neutralize one another, and the general tendencies bearing on astigmatism become more evident when large numbers of cases are thus considered together. The corneal astigmatism is based directly on the ophthalmometric readings. The lens astigmatism is deduced from comparison of the corneal with the total astigmatisms, indicating the differences between the two.

It seems worth while to add to these norms, showing the prevalence and importance of regular astigmatism, the statement of the average amounts of corneal and lens astigmatism in these periods, with the extremes shown by each, in youth and old age. The extreme is indicated by the greatest difference between the two principal meridians, strength of cylindric lens, either convex or concave, required to correct it. The average before 25 years of age was 1.04 diopters of corneal astigmatism, and 0.61 diopter of lens astigmatism. After 50 years the average was 1.24 diopters of corneal, and 0.71 diopter of lens astigmatism. The extremes shown were, for corneal, 8 diopters before 25 and 9 diopters after 50 years. Both eyes had useful vision. The extremes for lens astigmatism were 4.25 diopters before 25 and 4 diopters after 50 years. The extremes of total astigmatism were not so great as the foregoing. Before 25 it was 6 diopters and after 50 years it was 7 diopters. The general effect of lens astigmatism is partly to neutralize the corneal astigmatism, but in a few cases the one is added to the other, even in the higher degrees. The radical change in the relations of vertical and horizontal astigmatism is connected with the increased influence of lens astigmatism after middle life.

In the preface to "Accommodation and Refraction of the Eye," Donders said: "For the oculist it is, perhaps, an additional advantage that I am no mathematician. . . . I have requested my friend, Hoek, our professor of astronomy, to look over it." John Green, one of Donders' earliest followers in studies of refraction, and the first in America to urge the importance of plano trial lenses, when 60 years old, took up, with the help of Prof. E. A. Engler, the study of algebra, trigonometry and analytic geometry and calculus because, he said, "Nearly all the advances that are made in my science are expressed in the publication in mathematical formulae, which I cannot read." Studies made by the statistical method, dealing with arithmetic, need not offer such great difficulties. Only by this method is it possible to handle the large number of observations that are needed to establish points of general biology and hereditary tendency, which must be recognized in our study and correction of errors of refraction. Some, who have not the command of a large clinic, may find, in long practice in a single community, the opportunity to study and settle problems that cannot be understood in any other way.

314 Fourteenth Street.

ABSTRACT OF DISCUSSION

DR. DAVID W. WELLS, Boston: The statement that "the norm for the development of senile cataract would destroy false hopes and ungrounded fears" is one in which I am deeply interested. The importance of this norm has been worrying me for many years. In 1924, at the Montreal meeting of the academy, I offered the following resolution: "Since the rate of development of any cataract is always uncertain, and since some never increase and in some cases the lens becomes clearer, in order to determine the value of any therapeutic method, one should be able to compare any series of results of a special treatment with an equal number of similar cases untreated, and as such data are not now available, I move that the expediency of appointing a committee to study the natural history of untreated senile cataract be referred to the council, with full power to act." This motion was seconded by Dr. Edward Jackson. I do not know whether it was ever acted on by the council. Certainly no such committee was ever appointed. What shall one say to the patient with beginning changes in the lens? Not cataract, though cataract it is, because to him the word means blindness at no distant date. Unfortunately, this opinion prevails with many medical men who have not given especial attention to the eye. Now, in order to protect oneself one says "There is a slight opacity in the lens, but it will probably never give you trouble." Then if some less careful ophthalmologist later discovers the cataract, one avoids the censure of carelessness or ignorance. But if one possessed

the cataract norm based on thousands of cases tabulated by fifty or a hundred men in different parts of the country, one might tell the truth and prevent the fears by showing the record. One recent writer has justified his continued treatment by saying: "It is salutary and reassuring to the average patient to offer hope of arresting a condition which he regards as hopeless." This is probably the attitude of many who persistently treat these patients and, if the case does not progress, allow them to believe that the treatment has retarded it. We have voted to refer to a committee the expediency of appointing a committee on norms. I suggest that in recognition of the wisdom of our Nestor in ophthalmology, it be called the Jackson Committee on Norms.

DR. J. MONROE THORINGTON, Philadelphia: This paper opens a wide field for those of a statistical trend of mind and emphasizes the importance of defining usual or standard types if one is to have proper understanding of the normal course in life processes and deviations therefrom. In applying this to refraction, Dr. Jackson points out the desirability of observing the averages and changes in a great number of eyes, regularly through considerable time periods in the same patients. In the group with spherical refraction the youngest subjects are brought to attention chiefly because of the existence of strabismus, this condition at an early age being much more evident to parents than any visual defect. I am inclined to believe that a more extensive study of young subjects will reveal a higher percentage of myopia than Dr. Jackson has indicated. In the next age group, from 5 to 10 years, attention is usually focused on actual visual defect, and the thoroughness of tests in modern schools must be credited for the large number of subjects on whom refraction is done during this period. Dr. Jackson classes as emmetropic the patients in whom the average of principal meridians shows less than 0.50 diopter of hyperopia or myopia, but practical emmetropia, the symptom-free group, may be granted a somewhat wider range among those with hyperopia. Percentage tables are only relative, owing principally to concentration of abnormalities in a physician's practice. A more general study of emmetropia will doubtless increase considerably the percentage falling into this category. An impressive feature of amblyopia is the age patients occasionally attain with no realization of a pronounced visual defect in one eye. Dr. Jackson divides the astigmatic group into the horizontal, vertical and oblique types. I believe additional study will further subdivide these, disclosing axial symmetry in the two eyes of many patients and pointing to the extreme rarity of certain oblique meridians.

DR. PETER C. KRONFELD, Chicago: The problem of normal refraction is a puzzling one. Dr. E. V. L. Brown and I in Chicago tried to determine the relative frequency of every refractive state. In 10,000 patients whom we examined under the influence of atropine we listed the two main meridians as units of refraction and by doing so we accomplished what is usually called a refraction curve. The greatest frequency falls on a point which corresponds to a refraction of plus 1.25 under atropine, and from there the curve slides down gradually on each side (myopic and hyperopic). Here one sees the same curve compared with the so-called normal frequency curve, which can be applied to most of the phenomena of nature (normal frequency curve of Gauss). The human refraction curve differs from it in several respects. From a study like this I should conclude that the most frequent refraction, namely + 1.25 under atropine, should be called normal refraction.

DR. EDWARD JACKSON, Denver: With reference to the normal course of myopia, the need for correction is illustrated by the case on page 279 of the presession volume, the middle of the page, of the man who used his eyes a great deal—a diligent student. He never had worn glasses, for the reasons given there, and for the reason probably that he had never taken the trouble to get accurate correction. At the age of over 50 his eyes were still becoming more myopic. That is only one of a large number of cases that I have seen, in which avoidance of a correcting lens is followed by a continued increase of myopia. The man in this case never wore correcting lenses. The cases of worst myopia did not materially increase after from 5 to 10 years of age. There is no necessary continuation of the increased myopia throughout life. There is no evidence of a nutritional factor; it is simply the use of the eyes, with correcting lenses, that allows excessive convergence to change to normal convergence. In most cases there was but slight apparent increase of myopia from 20 to 30. That is due partly to the natural increase in the maturity of the eyes, and partly to the slow conversion of some people to the need for wearing glasses. Some of them with pretty high myopia would not be convinced that it was worth while for them to use glasses, until something happened to shake their belief in their own wisdom. With reference to some statistics that have been mentioned by Dr. Kronfeld, I was struck on seeing these curves when the paper by Drs. Brown and Kronfeld was first published, with the close resemblance to what I had observed in a much smaller number of eyes, 4,000 instead of 10,000, when we found the greatest number had been 1 and 1.25 diopters of hyperopia. I think one can understand why the curves have a frequency of different amounts of ammetropia that do not correspond to the curve of Gauss. It is because, in the hustle and hurry today, the easy readjustment of the eye on a focus is becoming so important that those who do not have it and cannot easily adjust for the ordinary use of the eye are left out. So these high degrees of hyperopia and myopia are disappearing from statistics. With reference to the general study of norms, this study shows that they are of great importance and it also showed me that we are at the beginning of the study of norms. The most help will come from studies that men make of their own work. Then we may be able to do something in the way of collective study, but have not reached the stage in the study of norms that we can hand it over to a committee. Those who are interested must go ahead and study their own records. That is the beginning of all such studies.

Clinical Notes, Suggestions and New Instruments

OCCUPATIONAL DERMATITIS DUE TO LETTUCE*

HERBERT J. RINKEL, M.D., AND RAY M. BALYEAT, M.D.
OKLAHOMA CITY

This case is reported on account of certain features that are of practical importance from the standpoint of occupation and testing.

REPORT OF CASE

R. L. T., a woman, aged 43, a salad maker, noted an eruption of the skin, which began about five years ago on the dorsum of each hand and extended to the arms, neck and face. The lesion when first seen consisted of erythematous, papular and vesicular eruptions. In some areas there were discrete papulovesicular eruptions. In others they coalesced to form weeping and denuded areas ranging in size from a hazelnut to 1 or 2 inches in diameter. The eruption was most marked on the hands and forearm and about the nose and mouth. From time to time she was subject to urticarial eruptions, which would occur over the hand, forearm, arm, neck and face. The patient complained of extreme pruritus.

The history was negative as to the occurrence of other allergic diseases in the individual and in her blood relations. The patient had handled large amounts of lettuce in her occupation over a period of the past five years. The past and present history was otherwise irrelevant, and the physical examination gave negative results except for the skin eruption.

The course of the dermatitis was chronic with acute exacerbations. Since there was marked pruritus there were a number of secondary changes due to scratching.

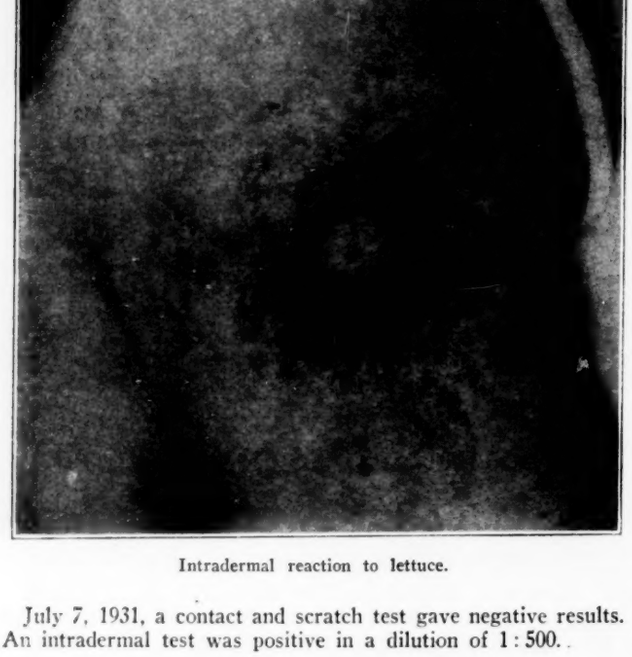
When first seen by us the patient was tested with all the different animal danders, pollens and dusts, without any positive reactors. She felt that lettuce was having something to do with the skin eruption, and since she gave a negative reaction at that time by the scratch method, the only method employed then by us, we bandaged some lettuce on her upper arm and obtained an erythematous papulovesicular lesion typical of the irritation on her forearm.

She was advised to continue making the salads but to have somebody else handle the lettuce entirely, with the result that

* From the Section on Diseases Due to Allergy, University of Oklahoma Medical School.

in three days' time she was entirely free from trouble. In a casual way one of us (R. M. B.) has seen this patient from time to time during the past five years and she has been entirely free from trouble except when she ate lettuce or actually worked with it.

On one occasion we saw her with a typical attack of dermatitis venenata due to poison ivy. Poison ivy extract was given with good results. Except for the poison ivy lesion, which was quite severe, and an occasional eruption on the fingers, due to her contact with lettuce, she has had no dermatitis during the last five years.



Intradermal reaction to lettuce.

July 7, 1931, a contact and scratch test gave negative results. An intradermal test was positive in a dilution of 1 : 500.

INDUSTRIAL AND ECONOMIC ASPECT

This patient was sent to us by the Industrial Commission of the State of Oklahoma, since the insurance carrier had been complaining because it had been paying partial time disability over quite a period. She presents an industrial aspect that deserves consideration since there are many cases of occupational dermatoses. In successfully combating occupational dermatitis, physicians are not only fulfilling their first duty, namely, relief of pain and suffering, but they are saving industries, insurance companies and manufacturing plants thousands of dollars, and they are transforming individuals from those who are able to work only part time or not at all on account of their dermatitis to men and women who can carry on gainful occupations.

COMMENT

The case of occupational dermatitis reported here was sufficiently severe to affect the general health of the patient over a period of five years. The usual scratch tests were of no value from a diagnostic standpoint. The fact that she gave a history of handling large amounts of lettuce led us to use a lettuce contact test, with a positive result. The elimination of lettuce from her diet and the avoidance of contact with lettuce in her work effected a clinical cure.

From the standpoint of testing, it is interesting to note that at the present time she gives a negative scratch and contact reaction with lettuce but a positive intradermal reaction. Contact tests were made both on the arm and on the back and were observed over a period of seven days. Another point deserving of note is the production of a typical contact type of dermatitis from the ingestion of lettuce. The possibility of contact with lettuce when it was in the diet is difficult to evaluate. The patient notes that ingestion of lettuce will produce a more marked urticarial eruption than occurs when lettuce is handled in salad making. There were no gastro-intestinal symptoms referable to eating lettuce.

1200 West Walker Street.

A CASE OF POSTOPERATIVE PROGRESSIVE GANGRENE OF THE SKIN

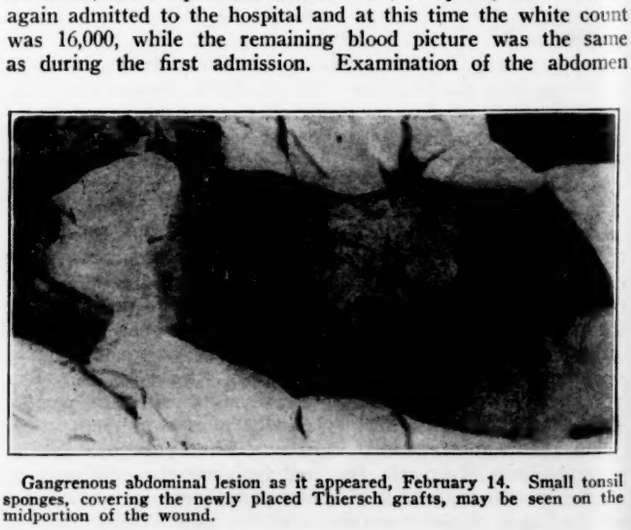
W. H. BAKER, M.D., AND C. C. TERRY, M.D.
SOUTH BEND, IND.

History.—F. R., a man, aged 32, an American, married, was admitted to the hospital, Aug. 30, 1930, complaining of malaise, chills and moderate abdominal distress. Shaking chills were experienced at intervals of from three to nine hours for a day prior to admittance. These symptoms appeared after a long and strenuous game of tennis. There were no gastro-intestinal symptoms other than dull pain over the entire lower part of the abdomen. No cardiac, respiratory or nervous symptoms were present. The past history was irrelevant, except for malaria eight years before while in the South. The family history was negative.

Physical Examination.—The patient was tall, was of esthetic type, and appeared to be in good general health. The head, neck, chest, heart and extremities presented no abnormalities. The abdomen was scaphoid and without rigidity or palpable masses. There was, however, slight discomfort on deep pressure throughout both lower quadrants. There was no localization of tenderness. A rectal examination caused general pelvic discomfort. The prostate was thought to be somewhat enlarged. The temperature varied between 99.4 and 102 F. Blood examination revealed 3,400,000 red blood cells and 13,000 leukocytes, with a differential count that showed 80 per cent of polymorphonuclears. Blood culture and blood sugar were normal and the Wassermann reaction was negative. Examinations of urine and stools were entirely negative on numerous occasions. Cognizant of the foregoing observations, a diagnosis was made of localized pelvic peritonitis of unknown origin, and conservative treatment was carried out.

Clinical Course.—The chills ceased after three days' hospitalization, and the general condition improved except for prostration, which was thought to be due to too arduous executive duties. After one month, complete recovery was thought to have taken place, and on October 2 the patient was discharged from the hospital. At this time the white blood count was 9,500 and the tenderness of the abdomen had subsided.

October 19, the patient was again taken ill with abdominal pain and nausea. The bowels were constipated. There were no chills; the temperature was 99.2 F.; the pulse, 88. He was again admitted to the hospital and at this time the white count was 16,000, while the remaining blood picture was the same as during the first admission. Examination of the abdomen



Gangrenous abdominal lesion as it appeared, February 14. Small tonsil sponges, covering the newly placed Thiersch grafts, may be seen on the midportion of the wound.

at this time revealed tenderness in the right lower quadrant, but there was no well defined localization and no rigidity. A rectal examination again caused distress.

A diagnosis of appendicitis was made, and on October 20 an appendectomy was done under nitrous oxide and oxygen anesthesia. The tip of the appendix was found lying over the brim of the pelvis close to the right iliac artery. There were adhesions which made delivery difficult, but, when exposed, an abscess was found in the distal portion of the appendix. This abscess was ruptured during removal. Two cigaret drains

were left in the wound. The drains were removed in twenty-four hours and an uneventful convalescence progressed until the ninth day, when the three silkworm sutures were removed.

October 29, an elevated dark red spot the size of a twenty-five cent piece (25 mm.) was noted just mesial to the right rectus incision. This small abscess was incised and treated with hot packs of boric acid solution. Within two days this abscess appeared as a gangrenous lesion of serpiginous configuration, with undermining of the skin edges. The lesion was bathed in a considerable amount of purulent exudate, which apparently originated in the subcutaneous tissue under the overhanging skin edges.

As the gangrene continued its peripheral extension the skin died, following destruction of the underlying fat. All tissues were destroyed down to but not including the fascia. Microscopically the tissue showed a dense infiltration down to the fascia. This included numerous polymorphonuclear leukocytes and lymphocytes. The cultures taken at various times invariably yielded a nonhemolytic streptococcus and a hemolytic Staphylococcus albus. No diphtheroid bacilli were found. Mycelia, sulphur granules, and yeast cells were constantly searched for but not found. The process continued in spite of all local and general measures to check it. In turn the following local applications were given a thorough trial: boric acid solution, physiologic solution of sodium chloride, solution of hydrogen peroxide, mercurochrome-220 soluble, gentian violet, surgical solution of chlorinated soda, 1:5,000 solution of potassium permanganate, sodium perborate, and autogenous bacteriophage. Roentgen and ultraviolet rays were also used without effect. General measures included sulpharsphenamine, autogenous vaccine, bacteriophage, and foreign proteins intramuscularly. During January and February, 1931, a series of seventeen blood transfusions were given.

It was exceedingly difficult to keep the wound clean, and on numerous occasions it was necessary to excise the necrotic skin with a scalpel. Nitrous oxide and oxygen were administered on these occasions.

By February 1 the gangrene had extended so as to include the skin of the entire abdomen, from a point just above the costal margin to the pubis and parts of the scrotum. Laterally the denuded area extended from the posterior axillary line on the left to the midscapular line posteriorly on the right. At various times excision of the lesion by electrical cutting and coagulation was considered but not done until Dr. W. D. Gatch of Indianapolis, who had been studying the case with us, recommended it after the success reported by Ballin and Morse.[1] February 3, the entire lesion was excised and coagulated with the Bovie electrosurgical unit. This effectively stopped the progressive gangrene, and most of the denuded area was covered with Thiersch grafts. A high percentage of the grafts grew and the wound gradually healed, but during the first part of May the patient developed an endocarditis and died, May 22.

The general health of the patient throughout his long illness remained good despite the extensive destruction of skin and fat. He always had a good appetite. Prostration and enemia, however, were prominent throughout.

COMMENT

Although cases of postoperative gangrene are comparatively rare, according to the small number of reports in the literature, it is important that physicians become cognizant of the condition so that a timely diagnosis can be made. In this case blastomycosis, actinomycosis, Arthus' phenomenon, furunculosis, Vincent's infection, and pyoderma gangrenosum were considered before the final diagnosis was made.

The salient features of this case seem to correspond essentially with those reported by other men. In brief, they are as follows:

1. The condition is always postoperative and most common following operations for appendiceal abscess.

2. The general health remains good, except for general weakness and anemia.

3. The laboratory studies invariably reveal a hemolytic staphylococcus and a nonhemolytic streptococcus, these two eventually existing in a symbiotic or synergistic relationship, in which each organism retains its own characteristics.

4. The destruction involves only the skin and the underlying adipose tissue.

5. Excision by cautery and electric knife offers the only known method of checking the advance of the gangrene.

1. Ballin, Max; and Morse, P. F.: Am. J. Surg. **11**: 81 (Jan.) 1931.

GIANT CELLS IN THE LYMPHOID TISSUE OF THE APPENDIX IN THE PRODROMAL STAGE OF MEASLES: REPORT OF AN ISOLATED CASE *

MORTIMER HERZBERG, M.D., CINCINNATI

The recent report by Warthin [1] of the finding of giant cells in the tonsils and pharyngeal mucosa in the prodromal stage of measles prompts me to place on record a similar finding in

Fig. 1.—Low power magnification, showing numerous giant cells in the lymph follicle of the appendix.

the appendix. This observation was withheld until now, in the hope of securing a second case of similar nature.

A. C., aged 6 years, was admitted to the Jewish Hospital, Nov. 17, 1930, complaining of headache, abdominal pain, localized chiefly in the umbilical region and upper quadrant, and

Fig. 2.—High power magnification, showing giant cells in various stages of formation, without and with surrounding protoplasm, in the lymph follicle of the appendix.

fever. There was no vomiting, but some nausea was present. There was no cough, "cold' or pain in the chest. No history of recent exposure to contagious disease was given. The temperature was 100.4 by rectum, pulse 104 and respirations 18. The blood count showed 6,900 white blood corpuscles, with a

* From the Pathological Laboratory of the Jewish Hospital.

1. Warthin, A. S.: Occurrence of Numerous Giant Cells in the Tonsils and Pharyngeal Mucosa in the Prodromal Stage of Measles, Arch. Path. **11**: 864 (June) 1931.

differential count of polymorphonuclears 76 per cent, lymphocytes 18 per cent, transitionals 5 per cent and eosinophils 1 per cent. The urine showed a trace of albumin, 3 plus acetone, an occasional red blood cell, a very occasional pus cell, a few epithelial cells and a large number of hyaline casts. A diagnosis of acute appendicitis with possible prodromal exanthema was made. The child was operated on the same evening. The surgeon made the following note: "Inflamed appendix with pinkish distal end. The omentum was slightly adherent to the cecum and appendix." The laboratory report on the gross specimen was "catarrhal appendix." The histopathologic diagnosis was: "Subacute appendix and marked follicular hypertrophy with numerous giant cells in the lymph follicles."

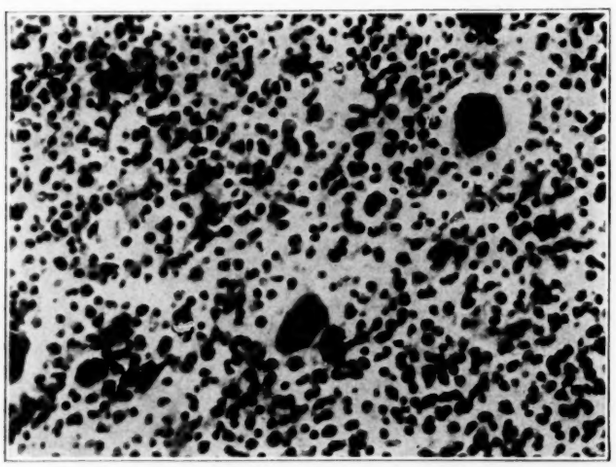


Fig. 3.—High power magnification, showing giant cells in various stages of formation, without and with surrounding protoplasm, in the lymph follicle of the appendix.

The temperature dropped to about 100 the following day and then abruptly rose to 103. November 21, the fourth postoperative day, a measly rash appeared on the face, body and extremities, with Koplik spots, conjunctivitis and cough. A definite diagnosis of measles was made, and the patient was transferred to the Department for Contagious Diseases of the Cincinnati General Hospital.

Curiously enough, only a few of the original sections made from the appendix showed lesions which checked closely with Warthin's observations in the tonsils and pharyngeal mucosa. Subsequent sections from various parts of the appendix showed only a few poorly defined giant cells.

Within several of the lymph follicles were seen giant cells of varying size, made up apparently of aggregations or coalescing cells of lymphoid origin. In some instances these groups lacked a surrounding protoplasm, and in others there was a distinct encapsulating protoplasm which took the eosin stain quite deeply. The nuclei of the giant cells were centrally grouped. The transition from one stage to the other is fairly clearly indicated in the photomicrographs. The lymph follicles showed a central cell exhaustion, such as is frequently found in lymphoid tissue draining areas of low grade infection or intoxication. No migration of the giant cells into the mucosa or musculature of the appendix was found. Otherwise the appendix showed little change save some slight evidence of hemorrhage and congestion, which may have been due to operative manipulation, and a slight round cell infiltration into the subserous and muscular walls.

This observation would confirm Warthin's suggestion of a distinct pathologic change in the lymphatic structures in the prodromal stage of measles. It would also show that the lymphatic structures other than those of the pharynx are involved early in the infection by the measles virus. This in spite of the fact that Warthin found no similar changes in the cervical lymphatics in his first case. It would in a measure substantiate the oft expressed view that the appendix is the "abdominal tonsil." It would further offer an explanation of the frequent occurrence of abdominal symptoms, appendiceal in character, in the acute exanthems.

No effort was made to examine the cells for evidence of bacteria or other micro-organisms. The appendix contains so numerous and varied a flora that any organisms found in sections would be of little significance. Warthin stained his sections in numerous ways and could come to no definite conclusion.

I have been unable to find in the recent literature on appendicitis in measles any reference to similar observations. It is hoped that others having greater opportunity to observe cases of measles may be stimulated to check these observations.

HEART GRAPHS THAT MOVE: A NEW AND BETTER METHOD OF DEMONSTRATING ELECTRO-CARDIOGRAMS *

HUGH ROBERTSON, M.D., SAYRE, PA.

We have been fortunate in successfully reproducing, on a strip of motion-picture film, electrocardiograms which really move when projected on a screen. The effect is most striking, bringing exclamations of surprise from men who have worked with electrocardiograms for years. Seeing the graph wriggle across the screen in the exact manner in which it was originally recorded (slowed, however, to a speed which the eye can easily follow), stopping obligingly at any place for explanation by the lecturer, gives one an entirely new and better conception of the electrocardiograph.

We developed this technic while casting about for a method of showing 40 feet of heart graph which Dr. Rorrald Hamilton of the Guthrie Clinic staff had obtained. This graph showed the heart action of a man during an attack of angina pectoris, the quieting down of the attack, an interval, and the onset and course of a more severe and fatal attack. It was a most dramatic tracing and we were anxious to show it in the most effective manner. What we attempted as an experiment worked splendidly. The resulting film was shown at the Philadelphia meeting of the American Heart Association.

The procedure is much simpler than we expected it to be. The electrocardiogram is first copied to scale on a strip of adding machine paper. This requires no artistic ability for it is merely the copying of a graph to scale. India ink is used. At each 0.5 cm. mark a line is drawn across the graph with a red crayon.

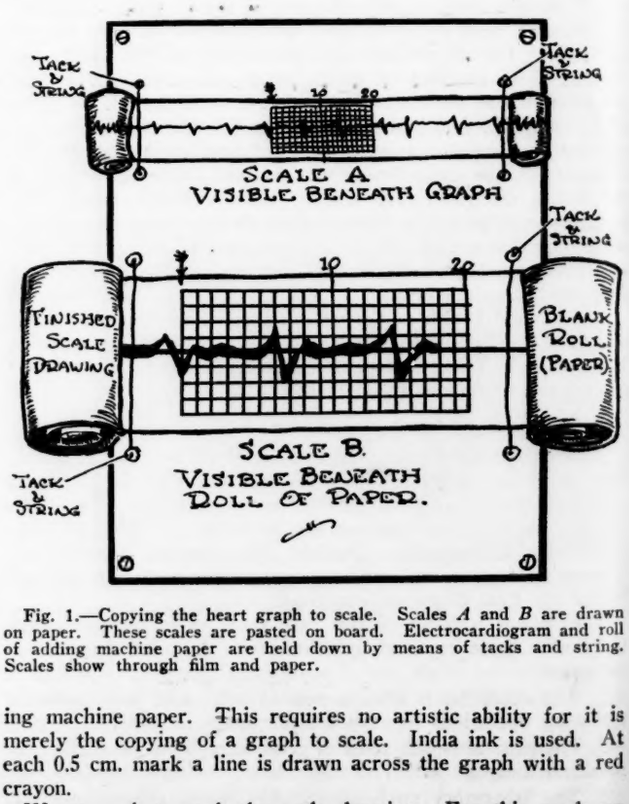


Fig. 1.—Copying the heart graph to scale. Scales *A* and *B* are drawn on paper. These scales are pasted on board. Electrocardiogram and roll of adding machine paper are held down by means of tacks and string. Scales show through film and paper.

We now photograph the scale drawing. For this work we use an old model A Ciné-Kodak with a single picture attachment, positive film, a 1,000 watt lamp, a sheet of heavy glass, and an

* From the Guthrie Clinic.

ordinary desk lamp. The apparatus is arranged as shown in figure 2.

The projection of the lens, as shown by focusing it on a piece of newspaper on the glass plate, is outlined on the glass with a wax pencil. The lens is set at f:8. The camera is about 45 cm. from the plate. Focusing is done on a strip of undeveloped film placed in the open camera before the film is loaded. One hundred feet of positive film is now put into the camera.

The strip of adding machine paper is stretched across the glass plate and held in position with paper weights. Over its middle portion is placed an ordinary sheet of bond paper the corners of which are fastened to the glass with strips of adhesive tape. The desk lamp beneath the glass plate is lighted. A new, clean strip of adding machine paper is placed exactly over the one on which the graph has been drawn. By means of the light from beneath, the drawing, with its red crosslines, may be easily seen.

All that now remains is to trace the scale drawing on the clean strip, one section (as marked off by the red crosslines) at a time, or less if very slow action is desired. After each section has been traced the lamp below is turned off, the 1,000 watt

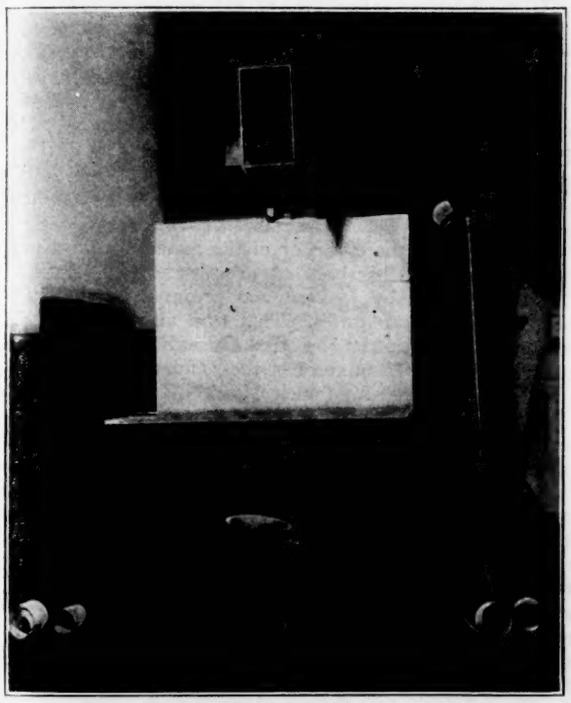


Fig. 2.—Complete set-up. Apparatus shown in place ready for photography. The position of the rolls of adding machine paper on the glass and the light beneath are shown particularly.

lamp is lighted and the new section photographed. When the area of lens projection has been filled (as outlined on the glass plate with wax crayon), both strips of paper are pulled to the opposite edge and the procedure repeated. Before going to a new scene, it is well to take about thirty exposures of the completed line. This will show this portion of the graph for a period of 2 seconds before the new portion begins to move.

A simplified technic, which does not give such nice results, consists in laying the drawing on the glass plate, covering it with a piece of bond paper, and uncovering the drawing one section at a time.

The positive film can easily be developed in any x-ray dark room by winding it about hangers and using the regular x-ray solutions.

Much value is added if titles are inserted at various places. These may be either made by oneself or obtained at low cost from a photograph finishing service.

The film should be run as slowly as possible, preferably in a projector permitting the film to be stopped at any place for explanations.

We shall be glad to answer any questions concerning the technic or to lend the film of angina pectoris described.

ECTOPIC PREGNANCY TERMINATING BY SKELETONIZATION OF FETUS AND EXTRUSION INTO RECTUM

G. W. GUSTAFSON, M.D.; E. J. MEREDITH, M.D., AND L. J. HORD, M.D., INDIANAPOLIS

When fetal death occurs in extra-uterine pregnancy owing to undue pressure plus faulty placentation, among the changes taking place in the body of the child are suppuration and skeletonization. Suppuration takes place in many retained extra-uterine fetuses, the process originating most frequently in the sac wall and thence spreading to the fetus, the infecting organism being in all probability the colon bacillus, which, according

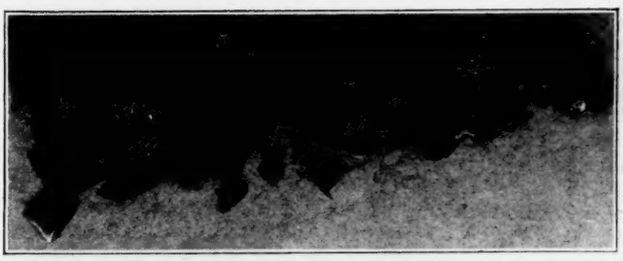


Fig. 1.—Number of bones removed from rectum.

to Schumann,[1] gains access to the sac wall by penetration of the intestinal wall along adhesion lines.

The inflammatory process is often of a low grade type and may end in the formation of a pelvic abscess, which points into the vagina or rectum, and portions of the fetal skeleton may be discharged into these parts.

The case here reported is of especial interest because of the fact that most of the fetal skeleton was found in the rectum.

REPORT OF CASE

M. R., a Negress, aged 42, admitted to the Indianapolis City Hospital, May 11, 1931, complained of pain in the rectum, diarrhea, vomiting and loss of weight. She was a dwarf of the achondroplastic type and was mentally slow, so that it was difficult to obtain a complete history.

In August, 1930, vaginal bleeding began, usually spotting, but at times more severe. Previously her periods had always been regular. The patient continued to lose some blood and

Fig. 2.—Comparative size of bones.

lost both weight and strength until, in December, she went to bed and stayed there until April, when she began to get up at intervals. She did not think that she was pregnant and she did not notice any abdominal enlargement. About the first of May, she had extreme pain in the rectum and developed what she termed a diarrhea. A thin, brown, watery, foul smelling fluid passed from her rectum numerous times during the day and even at night when she was asleep. She rapidly became worse, developed fever, lost her appetite and began to vomit. A private physician was called, who did a rectal examination

1. Schumann: Gynecological and Obstetrical Monographs 7: 89.

and found a large mass which he thought contained some bones. He immediately referred her to the hospital. Her past history was irrelevant except for the fact that she had had one known pregnancy fifteen years previously and aborted at about five months.

Examination showed that she was emaciated and weakened (according to the patient she had lost almost 100 pounds [45.5 Kg.] since becoming sick.) A large mass was found in the rectum both by rectal and vaginal examination. The entire pelvis was very sensitive and the uterus could not be outlined.

The patient was given an anesthetic, and the mass was removed digitally. It was found to contain fecal material surrounding fetal bones from the skeleton of a fetus of about five months. The bones, as illustrated, included the clavicle, ribs, flat bones of the head and long bones of the extremities. On examination following the removal of the mass, the abdomen had a doughy consistency and the vaginal examination showed the uterus fixed by adhesions. Although no definite mass could be palpated there was increased density of the parametrial tissue. Digital examination of the rectum did not reveal the presence of a sinus.

The patient refused to permit further study and signed her own release from the hospital. She was seen by one of us (E. J. M.) six weeks after leaving the hospital. At that time she was up a good share of the time but complained of some pain about the rectum and of slight constipation. She had a good appetite and was gaining weight. No mass was palpable in the abdomen.

COMMENT

We were greatly disappointed at the patient's insistence on leaving the hospital as we wanted a proctoscopic examination and a roentgenogram after a barium enema. We were also desirous of doing an intra-uterine injection of iodized oil at a later date when the low grade pelvic inflammation had subsided so that, if possible, the initial site of the extra-uterine pregnancy might be determined.

508 Hume Mansur Building.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

W. A. PUCKNER, Secretary.

FIBROGEN LOCAL-MERRELL.—Suspension of Fibrinogen and Cephalin for Local Use.—A sterile suspension of tissue fibrinogen and cephalin. It contains 1.5 per cent of tissue fibrinogen and 0.5 per cent of cephalin in a solution of sodium chloride 0.9 per cent.

Actions and Uses.—See New and Nonofficial Remedies, 1931, p. 186, Fibrin Ferments and Thromboplastic Substances.

Dosage.—Fibrogen local-Merrell is applied locally, undiluted.

Manufactured by the Wm. S. Merrell Company, Cincinnati. U. S. patent Re. 16, 639. U. S. trademark 208,383.

Fibrogen Local-Merrell, 7 cc. Vials.

Fresh beef lungs are finely ground and extracted with 1 per cent sodium chloride solution. To the filtered extract is added an equal volume of saturated ammonium sulphate solution. The globulin fraction which contains the tissue fibrinogen is precipitated and removed by filtration. A 1.5 per cent aqueous suspension of the globulin is made and sterilized by the addition of mercuric chloride. The mercury is removed by dialysis. The sodium chloride content is adjusted to make a concentration of 0.9 per cent. Cephalin, which acts as a stabilizer against loss of activity by heat, is added to the extent of 0.5 per cent. Cresol, which is added to maintain sterility after the container is opened, is added in the proper proportion so that the finished product contains 0.3 per cent. Bacteriologic tests are carried out to insure absolute sterility. The potency of fibrogen local-Merrell is determined by its ability to coagulate recalcified citrated or oxalated plasma and whole blood. When tested by the oxalated plasma method, the clotting time is reduced 85 per cent or more. The clotting power of fibrogen local-Merrell is also regularly tested on fresh whole blood as follows: Withdraw 10 cc. of blood from the heart of a rabbit, into an oiled syringe. Transfer 1 cc. into each of six test tubes, warmed to 37.5 C. in a constant temperature water bath. Add to each of three tubes which are to serve as controls 0.1 cc. of physiological solution of sodium chloride and mix, then to each of the remaining tubes an equal amount of fibrogen local-Merrell, and mix likewise. The blood in those tubes containing fibrogen local-Merrell shall have solidly clotted within fifteen to forty-five seconds, whereas the control blood will clot after fifteen to twenty-five minutes. The clotting time is thus reduced approximately 90 per cent. The amount of residual mercury after dialysis is determined by the electrolytic method. The amount of mercury present after dialysis is less than 1 part of mercury to 15,000 parts of fibrogen local-Merrell.

TYPHOID VACCINE (See New and Nonofficial Remedies, 1931, p. 376).

United States Standard Products Company, Woodworth, Wis.

Typhoid Vaccine (See New and Nonofficial Remedies, 1931, p. 381).—Also marketed in packages of one 5 cc. vial containing 1,000 million killed typhoid bacilli per cubic centimeter and in packages of one 20 cc. vial containing 1,000 million killed typhoid bacilli per cubic centimeter.

Typhoid Paratyphoid Vaccine Combined (See New and Nonofficial Remedies, 1931, p. 381).—Also marketed in packages of one 5 cc. vial containing, respectively, 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli, and 750 million killed paratyphoid B bacilli per cubic centimeter, and in packages of one 20 cc. vial containing, respectively, 1,000 million killed typhoid bacilli, 750 million killed paratyphoid A bacilli, and 750 million killed paratyphoid B bacilli per cubic centimeter.

DIAL-CIBA (See New and Nonofficial Remedies, 1931, p. 81).

The following dosage form has been accepted:

Tablets Dial-Ciba, 0.03 Gm. (½ grain).

PRELIMINARY REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT.

W. A. PUCKNER, Secretary.

NUCLEOTIDE K 96

Jackson and his collaborators reported (THE JOURNAL, Nov. 14, 1931, p. 1436) their clinical results in the treatment of twenty cases of profound leukopenia by intravenous injection of unbroken pentose nucleotides. They report recovery of fourteen of the patients but remark that "no definite conclusions can be drawn as to the efficiency of the material until a much larger series of cases has been adequately treated."

The product used by Jackson was prepared by the Smith, Kline & French Laboratories. That firm also requested consideration of the product by the Council under the name Nucleotide K 96, as "a mixture of the sodium salts of the pentose nucleotides derived from nucleic acid." The name "Nucleotide K 96" was used by Jackson and his collaborators at the suggestion of Dr. Minot, who informed the Council that the designation "K 96" was used because this was the number of the preparation that was finally decided to be the most effective or, at least, the most appropriate for intramuscular use. In a later communication Dr. Minot stated that the nucleotide fraction consists of a mixture of four nucleotides, the percentage of each nucleotide present being unknown. He further mentioned the possibility that other combinations of nucleotides or preparations derived from them might be discovered that will be of greater service and that such combination or preparation would replace the present product.

The Council deprecates the use of numbers in connection with names, which, if it becomes general will lead to confusion and will perpetuate the abuse of prescribing ready made mixtures by number. The Council held that unless it is the expectation that Dr. Jackson and his collaborators will develop and release a progressive series of nucleotides, it would appear better to dispense with the use of letters and numbers and to adopt some such acceptable name as "pentnucleotide."

The Council believes that pentose nucleotides or some similar preparation at present holds promise of instituting a new era in the treatment of a rare and usually fatal syndrome. However, the Council holds that the preparation now under consideration is not yet ready for general use by the medical profession and hence not eligible for acceptance for New and Nonofficial Remedies. Only twenty patients were treated with the nucleotide and the condition of agranulocytosis is so rare that it may be a long time before the results are confirmed. In the second place the intravenous injection of this product is often followed by fairly severe reactions. Finally, it is still doubtful whether pentose nucleotides will remain the preparation of choice. One of the authors quoted by Jackson, Reznikoff, reported striking results in three cases using the related substances adenine sulphate and the less soluble guanine hydrochloride.

Since the available experimental evidence is adequate and the composition of the product appears to be sufficiently controlled, the Council voted to issue this preliminary report on the product

reported on as "Nucleotide K 96" but postponed the question of accepting it for New and Nonofficial Remedies until more clinical data have been published and further studies have been made regarding the possibility of reducing the severity of the reactions.

REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.

W. A. PUCKNER, Secretary.

THROMBOPLASTIN-LEDERLE (FOR HYPODERMIC INJECTION) NOT ACCEPTABLE FOR N. N. R.

In view of the lack of evidence for the therapeutic value of thromboplastic substances other than those designed for external use, the Council in 1930 voted to omit from New and Nonofficial Remedies preparations of thromboplastin designed for subcutaneous or hypodermic administration and revised the general article on Thromboplastin and Thromboplastic Substances to omit any reference to such use. Thromboplastin-Lederle, admitted to New and Nonofficial Remedies in 1923, was stated in the firm's advertising to be intended for both external and internal use. The firm has now submitted its Thromboplastin Local-Lederle proposed only for external use. This product has been accepted by the Council. The firm, however, states that it still markets a thromboplastin solution to be administered by hypodermic injection, and in conformance with its earlier action the Council declared Thromboplastin-Lederle (for hypodermic injection) unacceptable for New and Nonofficial Remedies.

Committee on Foods

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

SMACO (205) CONCENTRATED LIQUID SKIM MILK (STERILIZED)

Manufacturer.—S. M. A. Corporation, Cleveland.

Description.—An evaporated almost fat-free skim milk.

Manufacture.—The milk used is collected in accordance with the provisions of the sanitary code of the Cleveland Board of Health and pasteurized by the holding system (see announcement of acceptance of SMACO (200) Whole Milk Sterilized, THE JOURNAL, Sept. 12, 1931, p. 781).

The pasteurized milk is almost wholly defatted by centrifugal method. The skim milk is heated to 93 C. for approximately ten minutes, transferred to "vacuum" pans, heated to 54-60 C. and concentrated until 68 per cent of the water has been drawn off. The concentrated product is conveyed to filling machines, from which it flows through "pin hole" openings into cans which are automatically sealed. The sealed cans are processed in autoclaves under such conditions of temperature and pressure that the product yields no bacterial growth by the "Standard Methods of Bacteriological Analysis of Milk" of the laboratory section of the American Public Health Association.

The product is handled in sanitary equipment which is thoroughly cleaned with brushes and washing solutions at regular intervals.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	80.0
Total solids	20.0
Ash	2.0
Fat (ether extract)	0.3
Protein (N × 6.38)	7.3
Lactose (by difference)	10.4

Calories.—0.8 per cubic centimeter; 23 per fluidounce.

Micro-Organisms.—The product yields no bacterial growth with the "Standard Methods of Bacteriological Analysis of Milk" prescribed by the laboratory section of the American Public Health Association.

Claims of Manufacturer.—This concentrated skim milk is especially prepared for infant feeding and may be used whenever a "fat free" milk is indicated. It is used in reducing the fat content of whole milk or evaporated milk.

KARO (Crystal White)

A table delicacy composed of corn syrup of the highest grade, granulated sucrose and pure vanilla

Manufacturer.—Corn Products Refining Company, New York.

Description.—A table syrup; a corn syrup base with added sucrose, flavored with vanilla extract.

Manufacture.—Karo Syrup (Crystal White) is prepared by mixing corn syrup with a relatively small amount of sucrose and vanilla extract for flavoring.

The corn syrup is manufactured by hydrolysis of high grade corn starch in dilute hydrochloric acid suspension. The mixture is heated under steam pressure until chemical tests indicate the desired degree of hydrolysis. The resultant mixture is almost completely neutralized with sodium bicarbonate and filtered through white linen filter cloth; the filtrate is passed through a deep bed of animal charcoal for decolorization and deodorization. The final filtrate, which is water clear and odorless, is concentrated under reduced pressure to a density of 1.38 (20 C./20 C.).

The final corn syrup obtained as described, a solution of sucrose, and vanilla extract are mixed in blending tanks at a temperature of 80 C. The mixture is filtered, filled into friction top cans and immediately capped.

Chemical Composition (submitted by manufacturer).—

	per cent
Moisture	25.4
Ash	0.2
Fat (ether extract)	0.0
Protein (N × 6.25)	0.2
Dextrins (by difference)	35.5
Maltose (method of Wesener and Teller, J. Indust. & Engin. Chem. **7**: 1009, 1916)	22.5
Dextrose (method of Wesener and Teller, J. Indust. & Engin. Chem. **7**: 1009, 1916)	7.5
Sucrose	9.0
Sulphur dioxide, less than	0.003
Titratable acidity as HCl	0.01

Calories.—3.0 per gram; 85 per ounce.

Claims of Manufacturer.—Karo Syrup is recommended for use as an easily digestible and readily assimilable carbohydrate supplement to milk in infant feeding and as a syrup for cooking, baking and the table.

PIXIE STRAINED SPINACH

(Mildly seasoned with salt)

Manufacturer.—Fruit Belt Preserving Company, East Williamson, N. Y.

Description.—Canned, sieved spinach containing in large measure the mineral and vitamin content of the raw spinach used; contains a small amount of added salt.

Manufacture.—The spinach is sorted, trimmed, thoroughly washed in a special machine, and again washed by water sprays on a conveyor belt, is blanched in hot water (79 C.) until thoroughly wilted, is completely broken down with steam in closed kettles, and is then sieved, canned and processed by essentially the same procedure as that for Sieved Carrots (THE JOURNAL, Nov. 14, 1931, p. 1467). A small amount of salt is added.

The spinach may be canned before sieving, in which case the spinach is packed in No. 10 tins, covered with boiling water, sealed and processed for sixty-five minutes at 115 C., cooled and stored until required for preparation of the sieved product.

Chemical Composition (submitted by manufacturer).—

Specific gravity 20 C./20 C.	1.03
	per cent
Moisture	94.5
Total solids	5.5
Ash	1.4
Fat (ether extract)	0.3
Protein (N × 6.25)	1.8
Crude fiber	1.1
Carbohydrates other than crude fiber (by difference)	0.9

Calories.—0.1 per gram; 3 per ounce.

Vitamins; Micro-Organisms; Claims of Manufacturer.—See these sections for Pixie Strained Carrots.

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SATURDAY, JANUARY 9, 1932

THE PHYSICIAN'S SHARE IN THE FAMILY BUDGET

Today, even in the face of the great strides made by both personal hygiene and preventive medicine, waste of life through preventable disease and death continues. The cost of illness in the United States runs into millions of dollars. If the potential earnings of those who are afflicted are taken into account, the loss reaches staggering figures. Years ago, in discussing the general value of increased vitality, Fisher [1] indicated that money estimates of waste of life are necessarily imperfect and sometimes misleading. The real wastes can be expressed only in terms of human misery. Poverty and disease are twin evils and each plays into the hands of the other. From each spring vice and crime. Again, whatever diminishes poverty tends to improve health, and vice versa. Nearly a quarter of a century ago, when Fisher made his statement, it was claimed that by the reasonable application of scientific knowledge at least fifteen years could be added to the average lifetime. At least 40 per cent of American mortality, it was concluded, was preventable or postponable and it was urged that there were constantly three million people ill in this country, some 50 per cent of this illness probably being preventable.

Meanwhile commendable progress has been made, notably through the contributions of preventive medicine. A large share of the credit devolves on the agencies fostered by organized medicine in the form of local, state and federal safeguards and on the dissemination of the newer knowledge in this field. The expectation of life has been notably increased. The menace of a number of diseases has been overcome, while others are exhibiting new hazards as a consequence of our advancing civilization and altered modes of existence. The problem of combating illness, relieving suffering and restoring health continues to challenge the attention of the medical profession above all other persons.

The comment that public health is a purchasable commodity is usually applied to stimulate the interests of communities, small or large, in the possibilities of organized preventive medicine and its imperative financial needs. Minor ailments such as are attended by the industrial physician are far more common than most persons realize. They often deserve far more attention than they receive, because they may become the gateway to more serious disorders. Nevertheless a few writers without intimate acquaintance with medicine depict the medical profession as a group organized to take advantage of the sick and disabled. From their ravings it might be assumed that the practice of medicine is a modern "racket." Physicians are willing to admit the existence of abuses in individual instances. All vocations include persons for whom apologies must be offered and who deserve and often are subjected to excommunication. But the facts of the actual expenditure to private physicians would probably be surprising to most of the critics as well as to the world of patients in general. The Committee on the Costs of Medical Care has recently made a survey [2] of the expenditures of a representative community of about 100,000 persons about equally divided between urban and rural districts. The per capita wealth was estimated to be more than $3,000, with a spendable money income of $1,255 per person; therefore the situation does not concern a center of poverty. Seventy-nine physicians rendered service there in private practice. The "average" physician normally devoted forty-nine hours a week to the practice of medicine, including thirty hours in the office, twelve hours in home calls, and seven hours in hospitals. The average working time of specialists was forty hours a week, and that of partial specialists forty-eight hours. The general practitioner, however, has a much heavier schedule: his normal working week is fifty-seven hours. There was no dearth of sickness. The reports showed 1,550 cases of communicable disease exclusive of venereal infections. There were more than 250 cases of tuberculosis. About 1,300 births received medical attention.

This is clearly a record of service that merits compensation. Yet in 1929, a period of prosperity, the people of this representative cross section of our population paid only approximately $871,000, or $8.71 per capita, in physicians' fees. Of this amount $412,000 went to general practitioners, $236,000 to partial specialists, and the remaining $223,000 to complete specialists. The corresponding average gross incomes are $8,766, $13,111 and $15,929 per physician in these three groups, respectively. These amounts do not, of course, represent the net incomes of physicians for, on the average, only 64 per cent of their gross income remains with them. The remaining 36 per cent is used to cover the various professional expenses of practice. When these expenses, amounting to $303,000, are deducted

1. Fisher, Irving: Report on National Vitality, Its Wastes and Conservation, Bulletin of the Committee of One Hundred on National Health, number 30, Government Printing Office, Washington, 1909.

2. Sinai, N.: A Survey of the Medical Facilities of San Joaquin County, California, 1929.

from the aggregate amount of fees collected, it develops that the 79 physicians in private practice received a total net income of $568,000. The average net income of general practitioners is $5,689, of partial specialists $7,994, of complete specialists $11,178, and for all groups combined $7,187 per physician. The receipts of the physicians in private practice represented only one fourth of the total cost of medical care, an equivalent amount being spent in hospitals and a large item (18.7 per cent) in drug stores. The dentists received nearly 16 per cent of the total. The amount spent for public health activities represents only a little more than 3 per cent of the total medical bill of the group. It would be difficult to make a case for extortion out of such modest figures. Indeed, a comparison with the per capita expenditures for tobacco, alcoholic beverages, candy and chewing gum would prove to be "interesting reading." The cigarets, for instance, might not be so "kind" to the pocketbook.

ADDISON'S DISEASE FROM SELECTIVE DESTRUCTION OF THE SUPRARENAL CORTEX

Addison's disease is usually associated with tuberculosis of the suprarenal glands; rarely it is due to neoplasms, infarction, amyloid disease or congenital malformation of the glands. Since there is almost complete destruction of the suprarenal glands in these conditions, information is not available concerning the extent to which the clinical picture depends on loss of the cortical function or on destruction of the medulla. In about 10 per cent of the cases of Addison's disease there is found a selective destruction of the cortical elements alone. In these cases the medulla is in such a state of preservation that, as far as morphologic evidence permits one to judge, it should be able to function adequately. Brenner,[1] in an analysis of forty-three cases of this type, noted that in no case did Addison's disease depend on the destruction of the medulla with the cortex left approximately intact; at least no such case has been convincingly described.

Wells [2] has recently reported five cases of clinically typical Addison's disease, diagnosed as such before death, associated with marked selective loss of suprarenal tissue, especially of the cortex, and independent of tuberculosis or other known agency. The essential pathologic process in all these cases was a selective loss or necrosis of the suprarenal cortex, and all the other changes seen in the suprarenals seemed to be secondary to such a selective loss of the cortical epithelium. There was also a variable amount of loss of medullary tissue but it was never as marked as that of the cortex. There was little formation of fibrous tissue, indicating that the primary process was not inflammatory. In none of the cases was there evidence of injury or occlusion in the suprarenal blood vessels.

The resemblance to the changes seen in acute yellow atrophy of the liver was striking; there was the same selective necrosis of the glandular epithelium, followed by the appearance of large, atypical cells in the process of regeneration and compensatory hypertrophy. This resemblance both of the tissue damage and of the regenerative changes in the surviving cortical epithelium to the process seen in acute yellow atrophy of the liver suggests that the suprarenal condition also is a result of a toxic necrosis by some poison selectively injuring the epithelium of the suprarenal cortex. The bilateral character of the lesion indicates its hematogenous character. The histories in the cases reported so far, however, do not give any clue as to the source or nature of the hypothetic poison.

About the only other anatomic change found outside the suprarenal glands in the cases reported by Wells was the marked infiltration of the thyroid gland with lymphoid cells. This occurred not only in the form of interstitial collection of lymphoid cells but also as a collection of large areas of lymphoid tissue. This infiltration of the thyroid gland with lymphoid tissue has been found in cases of Addison's disease associated with suprarenal tuberculosis, but it seems to be much less marked in this group of cases than in those with selective necrosis of the suprarenal cortex.

Such cases furnish a valuable natural experiment demonstrating the vital importance of the cortex and prove that clinically recognizable Addison's disease appears when the cortex is destroyed, often despite the preservation of the medulla. They may also offer an opportunity of securing information on the functions of both cortex and medulla in man. Naturally the possibility of treating such cases with extracts of the suprarenal cortex will receive especial attention.

INFLAMMATION AS A DEFENSE MECHANISM

The fundamental aspects of the signs and symptoms of disease are of vital importance in treatment. Many of these signs are understood today little better than in the past. Fever as a sign of many abnormal conditions is important from both prognostic and therapeutic points of view. Indeed, reduction of fever alone has often been the goal of therapeutic effort. Such measures may have been taken at times without due realization of the possible significance of fever as a defense mechanism.

Inflammation too is well recognized as a sign of morbid processes, but its interpretation has varied widely. Prominent pathologists, notably Cohnheim and Adami, have long considered the possibility that inflammation also may be principally a defense mechanism. If this conception is correct, medical or surgical intervention in these processes should be based on sound

1. Brenner, Oscar: Addison's Disease with Atrophy of the Cortex of the Suprarenals, Quart. J. Med. **22**: 121 (Oct.) 1928.
2. Wells, H. G.: Addison's Disease with Selective Destruction of the Suprarenal Cortex, Arch. Path. **10**: 499 (Oct.) 1930.

knowledge of what changes are introduced at a particular stage. Menkin [1] has recently extended our understanding of inflammation and has apparently proved at least part of the mechanism by which this is a defense reaction. The fixation of foreign substances by the inflammatory process is the basis of the mechanism.

On injecting colloidal iron or ferric chloride (as he had previously done with trypan blue) [2] into the normal peritoneal cavity of rabbits, he found that a rapid accumulation of the metal occurred in the retrosternal lymph nodes. If, however, the injection was repeated following previous peritoneal inflammation caused by aleuronat or Staphylococcus aureus, a much smaller quantity of the metal reached the lymph nodes. Similar results were obtained when horse serum was injected into normal and inflamed peritoneal cavities. Samples of blood from the heart were tested for horse serum at varying intervals thereafter. The serum penetrated into the blood less rapidly from an inflamed than from a normal peritoneal cavity. It was also demonstrated that horse serum was held longer in situ when injected into an area of cutaneous inflammation than when injected into an inflamed peritoneal cavity.

To demonstrate further the accumulation and retention of foreign materials in inflamed areas, the skin of the abdomen of rabbits was treated by injections of Staphylococcus aureus. After about six or seven hours, ferric chloride was injected intravenously and quantitative determinations of the iron content of normal and inflamed skin areas were made. It was found that about three times as much metal accumulated in the inflamed as in normal areas of skin. This accumulation was also shown for trypan blue and horse serum.

In an effort to throw some light on the mechanism involved in the fixation, Menkin found that when ferric chloride or horse serum was added directly to an inflammatory exudate heavy precipitation occurred. When trypan blue was added, no effect was noted. This may explain the greater degree in which the former substances are retained in an inflammatory area but does not explain the retention of trypan blue. By injecting trypan blue at the periphery of an area of inflamed skin it was shown that this substance failed to penetrate the inflamed area, while normal skin areas serving as controls showed blue infiltration. This phenomenon is apparently due to the mechanical obstruction of the thrombosed lymphatics and fibrin network around the area of inflammation.

There remain after these studies certain unanswered questions. The accumulation of trypan blue, ferric chloride and horse serum in inflamed areas when these substances are put into the circulating blood is difficult to explain if their fixation is partly due to the mechanical changes of thrombosed lymphatics and fibrin. The causation and time of appearance of these manifestations of inflammation are essential features of this process which must still be investigated before the picture is completed. Certainly it is unwarranted to draw far reaching clinical conclusions from these studies, but the possibilities are fascinating.

1. Menkin, Valy: Inflammation, Arch. Int. Med. **48**: 249 (Aug.) 1931.
2. Menkin, Valy: Studies on Inflammation, J. Exper. Med. **51**: 879 (June) 1930.

Current Comment

FEDERAL INCOME TAX RETURNS

Physicians' income taxes are regulated by the revenue act of 1928. Federal revenues must be increased, however, and probably Congress will change the act before March 15, when the time allowed law for filing income tax returns expires. The publication of the usual annual synopsis of the requirements of law that relate specificially to physicians will be deferred, therefore, until it is known what changes will be made, if any. Physicians are advised to postpone within legal limits the filing of their income tax returns, in order to avoid such confusion as might result from filing returns under the law now in force, and then filing supplementary returns under such legislation as may be enacted hereafter. THE JOURNAL will keep its readers informed concerning the situation.

ABERRANT PANCREATIC LIPASE

The normal lipase of human blood will not hydrolyze true fats. The pancreas, however, secretes a true fat-splitting enzyme. Recent experimental studies indicate that this pancreatic secretion may appear in the circulating blood as a result of certain pancreatic or hepatic dysfunctions, with the suggested possibility that this aberrant pancreatic lipase may play an important part in the etiology of certain degenerative diseases of the central nervous system. The experimental work in support of this tentative conclusion was done by Crandall and Cherry [1] of the department of physiology of Northwestern University Medical School. These two investigators first ligated the pancreatic duct of dogs or produced other obstructing pancreatic lesions. Within twenty-four hours a lipase (or lipase activator) capable of hydrolyzing olive oil appeared in the blood stream. This circulating lipase usually persisted for from fourteen to fifty days after the experimental pancreatic obstruction. A similar though less pronounced aberrant lipolytic function followed Eck fistula and experimental ligation of the common bile duct. From this observation, Crandall and Cherry are inclined to believe that pancreatic lipase is normally absorbed into the blood stream from the gastro-intestinal tract and normally removed or inactivated by the liver, the experimental hepatic lesion merely allowing an abnormal retention of this normally absorbed gastro-intestinal enzyme. It was recently demonstrated by Brickner [2] that the blood of patients with multiple

1. Crandall, L. A., and Cherry, I. S.: Proc. Soc. Exper. Biol & Med. **28**: 570 (March) 1931.
2. Brickner, R. M.: Studies on Pathogenesis of Multiple Sclerosis, Arch. Neurol. & Psychiat. **23**: 715 (April) 1930.

sclerosis usually contains an atypical enzyme capable of causing myelinolysis. Brickner's tests were made on the spinal cords of rats in vitro. Crandall and Cherry,[3] therefore, applied their lipolytic index to a study of clinical cases. In multiple sclerosis they found a demonstrable olive oil splitting enzyme in the blood serum in 63 per cent of their cases, while 96 per cent of their control cases were negative. In selected nonparalytic cases with clinical diagnoses of liver or pancreatic involvement, they also found 63 per cent with demonstrable pancreatic lipase in the circulating blood. From these nonparalytic cases they are inclined to doubt that the aberrant myelinolysin of Brickner is the etiologic factor in multiple sclerosis and conceive it to be merely pathognomonic of hepatic or pancreatic abnormality or dysfunction. Such dysfunction, of course, may conceivably be secondary to some lesion of the central nervous system.

REPORT OF THE FOOD AND DRUG ADMINISTRATION

Recently, on the twenty-fifth anniversary of the enactment of the federal Food and Drugs Act, THE JOURNAL reviewed the underlying reasons for the law and the great improvement it has brought about in the quality of foods and drugs. In his annual report the chief of the Food and Drug Administration points out that some changes in the letter and interpretation of the law are still needed to assure the public the full measure of protection that was intended by Congress. An important amendment of the law passed in 1930 authorizes the Secretary of Agriculture to promulgate standards of quality for certain canned foods and to prescribe a label which differentiates substandard goods from those which meet the official standards. Substandard goods are labeled "Below U. S. Standard—Low Quality But Not Illegal." The Food and Drug Administration during the year collected 31,860 samples, which were analyzed. As in the previous year, cases of botulism were not encountered; sixteen alleged cases of food poisoning were investigated, but in only four did an examination of samples of food submitted indicate that they caused illness. A constant problem of the administration is the control of traffic in fresh, dried or canned fruits and vegetables. The administration detained about 30 per cent of more than 14,000,000 pounds of imported figs because they failed to meet the standards of the law; 570 fraudulently labeled proprietary medicines were seized, of which 123 were labeled so as to imply that they were effective against influenza. The labels on some other preparations carried false curative claims against rheumatism, malaria, diabetes and tuberculosis. The administration continued its campaign against misbranded antiseptics, against ether below pharmacopeial standards and against numerous crude drugs offered for entry at American ports and carried further its country wide survey of products subject to the caustic poison act. The fight to effect the passage of the federal Food and Drugs Act was long and bitter. In the twenty-five years of the law's existence, more than 18,000 actions have been deemed necessary to enforce the regulations. The struggle to prevent fraud and misrepresentation in the sale of food and drugs must be continuous, and it is fortunate that the forces working in the interest of the public have legal power with which to activate their campaign.

3. Crandall, L. A., and Cherry, I. S.: Proc. Soc. Exper. Biol & Med. 28: 572 (March) 1931.

Association News

MEDICAL BROADCAST FOR THE WEEK

American Medical Association Health Talks

The American Medical Association broadcasts on Monday, Wednesday and Friday, from 2:25 to 2:30 p. m., over Station WBBM (770 kilocycles, or 389.4 meters) of the Columbia Broadcasting System.

The program for the week is as follows:

January 11. The Ideal of the Olympic Games.
January 13. Health and Music.
January 15. Observe Health Rules in Prevention of Colds.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

Society News.—Dr. Luther L. Hill, Montgomery, recently gave a dinner in honor of the Montgomery County Medical Society.——Dr. Ralph McBurney, Tuscaloosa, showed a film on the relation of nutrition to dental health, December 10, before a joint meeting of the Tuscaloosa county medical and dental societies.——The Calhoun County Medical Society was addressed, Nov. 3, 1931, among others, by Dr. James R. Garber, Birmingham, on "The Doctor, His Office and the Patient."——At a recent meeting of the Conecuh County Medical Society, when it was entertained with an oyster supper by Dr. William R. Carter, Repton, Drs. Grady O. Segrest and Jacques H. Baumhauer, both of Mobile, spoke on treatment of diabetes and hypoglycemia, respectively.——Dr. Frank L. Chenault, Decatur, gave a paper on "Medical Ethics" before the Cullman County Medical Society recently.——Empyema was the subject of Dr. Alva A. Jackson, Florence, before the Lauderdale County Medical Society, Nov. 3, 1931.——A symposium on tuberculosis featured the November meeting of the Lee County Medical Society.——Dr. Jefferson C. Pennington, Nashville, Tenn., addressed the Madison County Medical Society, Nov. 10, 1931, on "A New Vesical Neck Resector in Prostatic Hypertrophy."

CALIFORNIA

Diploma Stolen.—Dr. Octavius M. Spencer, surgeon, U. S. Public Health Service, reported, December 21, that his medical diploma from Vanderbilt University, 1915, with endorsement thereon showing him to be licensed in Alabama, was lost when a grip in which it was contained was stolen from his automobile.

Annual Registration Fee Due January 1.—All practitioners of medicine and surgery in California are required by law to pay an annual tax and registration fee of $1 to the secretary-treasurer of the board of medical examiners, on or before January 1. If a physician or surgeon fails to pay this tax or fee within sixty days after January 1, his license to practice is thereby forfeited.

Lectures at Scripps Clinic.—Dr. Lewellys F. Barker, professor emeritus of medicine, Johns Hopkins University School of Medicine, Baltimore, is giving the annual Scripps Metabolic Clinic lectures for the members of the San Diego County Medical Society, San Diego, January 9, on "Obesity." Dr. Barker gave a series of bedside clinics, January 7-9. The Scripps Clinic Lectureship Endowment makes it possible to bring a lecturer to southern California each year.

Society News. — At the meeting of the San Francisco County Medical Society, January 12, Drs. Ann P. Purdy will speak on "Earlier Recognition of Rheumatic Infection"; Eugene S. Kilgore, "Suggestions for Better Diagnosis and Treatment of Coronary Disease"; John J. Sampson, "A Request for Cooperation in the Heart Morbidity Survey," and Jacob C. Geiger, "Heart Program of the San Francisco Board of Health."—— Dr. Robert R. Newell, San Francisco, addressed a recent meeting of the San Joaquin County Medical Society on "Use of the X-Rays in Treatment of Malignant Diseases," and Dr. Francis B. Sheldon, Stockton, "Impressions of Eastern Cancer Clinics."

Illegal Practitioners Fined. — A. E. Harland pleaded guilty, Oct. 13, 1931, to violating the medical practice act (advertising) in the municipal court of Los Angeles; he was sentenced to pay a fine of $100 or serve ten days in the city jail; his sentence was suspended. W. G. Weir received the same sentence. Weir and Harland operate the California Solarium in Los Angeles, where they advertise treatments for $2.50 each, consisting of sun cabinet baths and massage. Helen Parkinson, Santa Barbara, was sentenced to pay a fine of $200, October 14, when she pleaded guilty to violating the medical practice act. The fine was suspended on the condition of her not practicing any system of treating the sick or doing anything else that requires a state license until she has secured such license. A plate glass sign lettered in gold outside her office read "Dr. Helen Parkinson." These cases were reported by the state board of medical examiners.

Popular Medical Lectures at Stanford. — A course of popular medical lectures will be given during the winter quarter of 1932 in celebration of the fiftieth anniversary of these lectures, which were established by Dr. Levi Cooper Lane in 1881. Dr. Lane was the founder of the Cooper Medical College, now Stanford University School of Medicine, the Lane Medical Library and the Lane Medical Lectures. The following programs are being given on alternate Friday evenings at 8 p. m. in Lane Hall, Stanford University School of Medicine:

January 8: "Dr. Levi Cooper Lane and the Popular Medical Lectures," Dr. Emmet Rixford, San Francisco.

January 22: "Half-Century of Progress in the Recognition and Treatment of Disease," Dr. George Dock, Pasadena.

February 5: "Achievements in Surgery of the Past Fifty Years," Dr. Andrew Stewart Lobingier, Los Angeles.

February 19: "Contribution of Experimental Biology and Medicine to the Alleviation of Human Suffering," Dr. Herbert M. Evans, Berkeley.

March 4: "Social Aspects of Child Welfare," Dr. Henry Dwight Chapin, New York.

March 18: "Fifty Years of Progress in the Prevention of Disease," Dr. Jacob Casson Geiger, San Francisco.

COLORADO

Society News.—The Crowley County Medical Society was addressed, Nov. 10, 1931, at Ordway, by Drs. Harvey S. Rusk and Clarence E. Earnest, Pueblo, on foreign bodies in the upper respiratory tract and sinusitis, respectively.——Dr. J. T. Myers talked on Hodgkin's disease before the Delta County Medical Society recently.——At the November meeting of the El Paso County Medical Society, Dr. George W. Bancroft, Colorado Springs, spoke on "Surgical Treatment of Burns." —— Mr. Charles H. Haines addressed the Fremont County Medical Society recently on "The Law Applicable to the Medical Profession."——At the Nov. 4, 1931, meeting of the Larimer County Medical Society, Dr. Harry H. Wear, Denver, spoke on "Urological Diagnosis by the General Practitioner." —— Dr. Walter L. Newburn, Trinidad, addressed the Las Animas County Medical Society, Nov. 6, 1931, on "Sarcoma of the Femur."——The Mesa County Medical Society was addressed recently in Grand Junction by Drs. Arthur G. Taylor and Harvey M. Tupper on "Coronary Thrombosis" and "Present Status of B C G Vaccines," respectively.——At a recent meeting of the Morgan County Medical Society, Dr. William H. Halley, Denver, spoke on "Toxemias of Pregnancy."——The Pueblo County Medical Society was addressed, Nov. 3, 1931, by Dr. Rudolph H. Kampmeier, Pueblo, on cardiac pain.—— Dr. Leonard Freeman, Denver, addressed the Weld County Medical Society, Nov. 2, 1931, on "Significance of Retroperitoneal Lymphangitis."

CONNECTICUT

Annual Registration Fee Due During January.—All practitioners of the healing art practicing in Connecticut are required to register with the state department of health during January, on blanks furnished by the department, and to pay a fee of $2. A practitioner failing to register is subject to a fine of $5.

INDIANA

Personal.—A group of forty-five physicians from Elkhart, Whitley, Fulton, Marshall, Wabash and Kosciusko counties gave a dinner in honor of Dr. Angus C. McDonald, Warsaw, December 17. Dr. McDonald, who was president of the Indiana State Medical Association in 1930, will soon retire from the practice of medicine after forty years' service in Warsaw.——Dr. and Mrs. Orlando L. Stout, Upland, celebrated their golden wedding anniversary, Oct. 27, 1931.—— Dr. Augustus Case, retired physician of Akron, observed his ninety-ninth birthday, Nov. 7, 1931.

Society News.—Drs. Frank D. Martin and Charles H. Emery, Bedford, addressed the Lawrence County Medical Society, Dec. 2, 1931, on "Common Diseases of Nose, Throat, Ear and Eye."——The Whitley County Medical Society was addressed at Columbia City, Dec. 8, 1931, by Dr. Werner W. Duemling, Fort Wayne, on "Primary and Secondary Syphilis." ——Dr. Hamilton M. Arthur, Hazleton, addressed the Gibson County Medical Society at Princeton, Dec. 14, 1931, on "Diagnosis and Treatment of Malaria."——Drs. Edward L. Lingeman and Charles R. Sowder, Indianapolis, discussed the common cold before the Carroll County Medical Society in Delphi, Dec. 10, 1931.——The Fountain-Warren County Medical Society was addressed in Attica, Dec. 10, 1931, by Dr. Arthur J. Fletcher, Danville, Ill., on "Newer Things in Pediatrics."—— At a meeting of the Washington County Medical Society, Dec. 7, 1931, held jointly with the township trustees of Salem, it was agreed that a reduction of 20 per cent would govern all bills presented to the trustees for relief work. Dr. E. E. Huckleberry was elected president of the society.——Dr. William E. Fitch addressed the Orange County Medical Society at French Lick, Dec. 7, 1931, on jaundice. —— The Jasper-Newton Counties Medical Society was addressed, Dec. 4, 1931, in Morocco by Dr. Eugene Cohn, Kankakee, Ill., on points of interest to the physician and criminologist in disorders of the mind. —— A symposium on intestinal obstruction featured the meeting of the Hancock County Medical Society, Dec. 4, 1931; the speakers were Drs. Charles E. McCord, Samuel W. Hervey and Jesse E. Ferrell, Fortville.

KENTUCKY

New County Health Officers.—Four county health officers have recently been appointed, as follows: Drs. Carl M. Gambill, Blaine, Magoffin County, to succeed the late Dr. Robert J. Gillespie; W. P. Tucker, Whitley County, to head a new department; Nathaniel A. Mercer, Adair County, to head a new department; John Garland Carter, Lawrence County, to succeed Dr. Martin H. Skaggs, who recently went to Powell County.

Society News.—Dr. Harry K. Buttermore, Liggett, was elected president and Dr. Harry Linden, Harlan, secretary, of the Cumberland Valley Medical Society at a meeting in Harlan, Dec. 18, 1931. Speakers at the meeting were Drs. Donnan B. Harding, Lexington, on "Childhood Tuberculosis"; Oliver W. Hill, Knoxville, Tenn., "Anhydremia in Infants and Children," and Isaac A. Arnold, Louisville, "Different Methods of Internal Fixation of Fractures."——The Jefferson County Medical Society heard Dr. Albert Graeme Mitchell, Cincinnati, speak on "Childhood Tuberculosis from the Point of View of the Pediatrician" at a meeting in Louisville, Dec. 17, 1931.——Dr. Lawrence H. Med ey, Lexington, presented a paper on diabetic coma before the Daviess County Medical Society, Owensboro, Nov. 24, 1931.——Dr. William T. Dowdall addressed the McCracken County Medical Society, Paducah, Dec. 15, 1931, on diagnosis of duodenal ulcer. —— A symposium on pneumonia was conducted by the Grant County Medical Society at its meeting, Nov. 18, 1931, at Williamstown.

MAINE

Department of Health Reorganized.—At a special referendum election, Nov. 9, 1931, a reorganization of the state department of health was authorized by a vote of 41,077 to 35,368. The new law abolishes, among other things, the state department of health, public health council, department of public welfare and the positions of commissioner of health and public welfare commissioner, and provides for a department of health and welfare. According to the law, this department shall be organized into three bureaus: the bureau of health, the head of which shall be the director of health, who must be a physician; the bureau of social welfare, the head of which shall be the director of social welfare, and the bureau of institutional service. An advisory council, which is also provided for in the new law, has been appointed; its first meeting was held, January 6. This council is composed of six members, only one of whom, Dr. Ernest V. Call, Lewiston,

is a physician; his appointment is for six years. Governor Gardiner has appointed Mr. George W. Leadbetter as acting commissioner of health and welfare to succeed Dr. Clarence F. Kendall. Mr. Leadbetter has acted as messenger to the governor and council for more than twenty years.

MASSACHUSETTS

Society News.—Dr. William H. Robey, Boston, addressed the New England Physical Therapy Society, December 16, on "Nonvalvular Heart Disease."——Dr. William F. Verdi, New Haven, Conn., addressed the Massachusetts Italian Medical Society, December 14, on "Cancer of the Colon."——At the meeting of the Essex South District Medical Society, December 2, Dr. Raymond S. Titus, Boston, spoke on "Some Complications of Pregnancy and Puerperium."——Dr. George H. Bigelow, Boston, addressed the Essex North District Medical Society, January 3, on the relationship between the general practitioner and the department of public health.

Hospital News.—A new wing, containing research laboratories for the study of rheumatic infections, was opened at the House of the Good Samaritan, Boston, December 10. This institution announces that it has twenty-one beds for cancer patients and fifty-four for the care and study of rheumatic heart disease.——A new twenty-bed ward was opened in the center building of the New England Medical Center group in Boston, Nov. 27, 1931. It was made possible by a grant from the Bingham Associates Fund and will be used for observation, diagnosis and investigation. The facilities of the observation ward are available to patients from any part of New England. Dr. Samuel H. Proger is in charge.

MICHIGAN

The Seniors' Room.—Space has been assigned in the new headquarters of the Wayne County Medical Society to be known as the Seniors' Room, for physicians who have been in practice more than twenty-five years. Dr. Henry A. Luce is in charge of this arrangement. The first meeting of this group was held, December 28; 375 "seniors" belonging to the new Quarter Century Club of the society were present to discuss plans for the room. A house warming is planned for the society's new home soon.

Medical Relief Committee.—Dr. Simon P. L'Esperance, Detroit, has been appointed liaison member of the mayor's emergency unemployment committee. In this capacity, Dr. L'Esperance will act as chairman of a medical relief committee of ten to supervise care for unemployed families as a volunteer medical service to supplement the work of the department of public welfare and the city physician's office. Membership of the committee includes Miss Lyda Anderson, representing the nursing association; Mr. Bernard Bialk, the druggists' associations, and Drs. Alexander W. Blain, Birch J. Hamilton, L. Mae James, J. Frank Kilroy, Henry A. Luce, Solomon G. Meyers, Howard W. Peirce and David I. Sugar. The whole plan of volunteer medical service, as offered by the Wayne County Medical Society, has been approved and accepted by the mayor's office and the public welfare commission. All members of the society will be asked to cooperate with the relief committee. Hygiene and sanitary living conditions will be checked, ambulatory cases will be supervised, and acute cases will be hospitalized. According to the plan, a headquarters office will act as a clearing house for all cases, so that all the deserving will receive attention and that regular reports on the work of the medical profession may be correlated and furnished to the mayor. The expenses of the committee's work will be met by lay philanthropy.

MINNESOTA

Annual Registration Due During January.—All practitioners of medicine and surgery in Minnesota are required by law to register annually, during January, with the secretary of the state board of medical examiners, and to pay a fee of $2. It is a misdemeanor for a practitioner to continue in practice after February 1 without obtaining a certificate of annual registration from the board.

Quack Williams Fined Again.—Boyd T. Williams, who for years has maintained a cancer sanatorium in Minneapolis, was sentenced, December 19, to pay a fine of $1,000 or to serve one year in the Minneapolis workhouse. Williams paid the fine. This is the third time that Williams has been convicted of violating the medical laws of Minnesota since the enactment of the basic science law in 1927. In 1928 he paid a fine of $100 for practicing without a basic science certificate, and, in 1929, paid a $250 fine for a similar offense. In 1913 he was fined $50 for practicing medicine without a license. When arraigned recently, Williams informed the court that he had moved his sanatorium to Hudson, Wis., a statement which has been verified by the state board of medical examiners (THE JOURNAL, March 17, 1928, p. 861; April 12, 1930, p. 1153).

NEBRASKA

Society News.—Dr. Joseph A. Weinberg, among others, addressed the Omaha-Douglas County Medical Society, Omaha, December 8, on "Surgical Treatment of Bronchiectasis."——Prof. Henry E. Sigerist, professor of the history of medicine, University of Leipzig, Germany, delivered an address in Omaha, December 17, on "Medical Literature of the Middle Ages," under the auspices of the Omaha chapter of Alpha Omega Alpha.——Dr. Louis E. Moon, Omaha, addressed the Nebraska Pediatric Society recently on "Rectal Conditions in Infants and Children."——Dr. George E. Neuhaus, Omaha, among others, addressed the Madison Five Counties Medical Society, Norfolk, recently, on "Mild and Brief Forms of Manic-Depressive Psychosis and Their Treatment."——Drs. Joseph A. Weinberg and John E. Summers, Omaha, addressed the autumn meeting of the ninth councilor district recently in Lexington, on "Surgical Treatment of Pulmonary Tuberculosis" and "The Increasing Death Rate for Appendicitis," respectively.——Dr. Elmer M. Hansen, Lincoln, among others, addressed a joint meeting of the Gage County Medical Society and the third councilor district, November 12, in Beatrice, on "Late Toxemias in Pregnancy.

NEW JERSEY

Survey of Chronic Illness.—The research division of the state department of institutions and agencies is conducting a survey of chronic disease in the state. Hospitals, nursing homes, visiting nurse associations, private homes for the aged, county and municipal welfare houses and social agencies have been asked to participate in a census of all chronically ill persons. An effort will be made to secure a picture of the medical, social and economic problems arising from chronic disease and authoritative opinions as to the facilities needed to give adequate care. It was stated that 54 per cent of the deaths in New Jersey during 1930 were caused by chronic disease.

Society News.—Dr. Donald Miner, Jersey City, was elected president of the Society of Surgeons of New Jersey at the annual meeting, December 2, in Jersey City.——Dr. Hyman I. Goldstein, Camden, recently addressed the Karlsbad Medical Society, Karlsbad, Germany, on "Heredofamilial Angiomatosis."——Dr. Albert F. R. Andresen, Brooklyn, addressed the Bergen County Medical Society, Hackensack, Nov. 10, 1931, on gastrointestinal allergy.——Dr. John Wyckoff, Jr., New York, addressed the November meeting of the Academy of Medicine of Northern New Jersey on "Congestive Cardiac Failure."——Dr. J. Sydney Ritter, New York, addressed the Middlesex County Medical Society, Nov. 17, 1931, on "Seminal Vesicles as a Focus of Infection."——Dr. Horace S. Baldwin, New York, presented a paper on "Newer Methods of Treatment of Pneumonia" before the Morris County Medical Society, at a meeting in the New Jersey State Hospital, Greystone Park, Nov. 19, 1931.——Drs. James Burns Amberson, Jr., and William L. Weintraub, New York, addressed the Passaic County Medical Society, Paterson, Nov. 12, 1931, on "Differential Diagnosis of Pulmonary Tuberculosis" and "Childhood Types of Tuberculosis," respectively.——Dr. Ira S. Wile, New York, addressed the Hudson County Medical Society, Jersey City, December 1, on "Physical Factors in Juvenile Behavior."

NEW YORK

Society News.—Dr. Franz M. Groedel, Bad Nauheim, Germany, addressed the Syracuse Academy of Medicine, December 15, on "Increasing Incidence of Heart Disease and Its Causes." Dr. Groedel is in the United States to advise in the development of Saratoga Springs as a health resort (THE JOURNAL, Sept. 12, 1931, p. 787).

New York City

Afternoon Lectures at the Academy.—Dr. Frederic E. Sondern gave the Friday afternoon lecture at the New York Academy of Medicine, January 8, on "Laboratory Tests and Diagnosis—Their Value to the Practitioner." Lectures during January and February will be as follows:

Dr. Carl P. Sherwin, January 15, "Obesity—Metabolic Studies in Its Treatment."
Dr. Frankwood Williams, January 22, "How to Meet the Problems of Adolescence."
Dr. Walton Martin, January 29, "Acute Surgical Conditions in the Abdomen."
Elmer Verner McCollum, Sc.D., Baltimore, February 5, "Therapeutic Value of Our Present Knowledge of Vitamins."
Dr. Rollin T. Woodyatt, Chicago, February 19, "Emergencies Arising in the Course of Diabetes."
Dr. George M. MacKee, February 26, "Treatment of Disturbances of Hair Growth with Special Reference to Baldness."

Society News.—The American Social Hygiene Association will hold its New York regional conference in New York, January 22. Subjects announced in the preliminary program are "Immediate Plans for Social Hygiene Work in New York City and Upstate New York," "Present Principles and Problems of Legal and Protective Measures for the Repression and Prevention of Prostitution," "Social Hygiene in Relation to Unemployment," "Marshaling the Community Resources for the Protection of the Family" and "Preparation for Marriage and Family Life."——The Physicians' Art Club will hold its sixth annual exhibit of paintings, sculpture and kindred arts, February 15 to March 12. Physicians who are not members are invited to exhibit. They should communicate with Dr. Louis C. Schroeder, 50 East Seventy-Second Street.——George Gordon Battle, New York attorney, addressed the New York Physicians' Association, December 23, on "The Medical Aspects of Prohibition."——Dr. Charles Hendee Smith addressed the American-Hungarian Medical Association, Dec. 21, 1931, on infant feeding. Among others, Drs. Béla Schick and Alfred F. Hess also discussed this subject.——Dr. Louis E. Phaneuf, Boston, addressed the New York Obstetrical Society, Dec. 8, 1931, on "Radium Therapy in Uterine Hemorrhages of Benign Origin."——The eastern section of the American Laryngological, Rhinological and Otological Society is meeting at the New York Polyclinic Medical School and Hospital, January 9. Among speakers are Drs. Joseph C. Beck and Melvin Reese Guttman, Chicago, on "Relation of Histopathology of Nasopharyngeal Neoplasms to Their Radiosensitivity"; William P. Wherry, Omaha, "Immediate Postoperative Technic in Radical Surgery of the Maxillary Sinus"; Max A. Goldstein, St. Louis, "The Deaf Child," and De Forest C. Jarvis, Barre, Vt., "The Red Nasal Septum Syndrome." Dr. Lee M. Hurd is chairman of the eastern section.

OHIO

Personal.—Dr. Robert B. Cofield has resigned as associate professor of orthopedic surgery at the College of Medicine of the University of Cincinnati.——Dr. Guy W. Fishbaugh, Minford, was recently appointed health officer of Scioto County.——The Logan County Medical Society recently held a meeting in honor of Dr. William S. Philips, Belle Center, who completed fifty years in the practice of medicine in December. The society presented a chair to Dr. Philips.——Dr. Edmund R. Brush has been appointed city superintendent of health and sanitation of Zanesville to succeed the late Dr. David J. Evans.

Society News.—Dr. Marion A. Blankenhorn, Cleveland, addressed the Summit County Medical Society, Akron, Nov. 3, 1931, on "The Neurological Aspects of Pernicious Anemia."——Dr. George Gellhorn, St. Louis, gave the annual D. Tod Gilliam Memorial Lecture of the Columbus Academy of Medicine, Nov. 9, 1931, on "Causes and Treatment of Vaginal Discharge."——Drs. Robert and Ralph G. Carothers, Cincinnati, addressed the Crawford County Medical Society, Bucyrus, in November, on modern treatment of fractures.——Dr. Chevalier Jackson, Philadelphia, gave a public lecture in Youngstown, Dec. 15, 1931, under the sponsorship of the Mahoning County Medical Society, on "Prevention of a Certain Class of Accidents to Children."——Dr. Howard M. Brundage, Columbus, addressed the Muskingum County Academy of Medicine, Zanesville, Dec. 2, 1931, on "Analysis of Heart Murmurs."——Drs. Francis M. Oxley and Charles J. McDevitt, Cincinnati, addressed the Clermont County Medical Society, Owensville, Nov. 18, 1931, on "Hemorrhoids" and "Principles of Diagnosis and Treatment in Urinary Surgery," respectively.——Drs. James R. Caywood, Piqua, and George E. McCullough addressed the Miami County Medical Society, Troy, Nov. 6, 1931, on "Treatment of Traumatic Injuries of the Brain," and "Injection Treatment of Varicose Veins," respectively.——Dr. Elmer Hess, Erie, addressed the Ashtabula County Medical Society, Conneaut, Nov. 10, 1931, on "Differential Diagnosis of Kidney and Gastro-Intestinal Pain."——Dr. Alexander S. McCormick, Akron, addressed the Portage County Medical Society, Ravenna, Nov. 4, 1931, on "The Evolution of Antiseptic Surgery."——Dr. George W. Crile, Cleveland, addressed a joint meeting of the Guernsey, Coshocton, Noble and Muskingum county medical societies, at Cambridge, Nov. 20, 1931, on the effects of emotional strain on health.

OKLAHOMA

Not a Texas Graduate.—Information received from the University of Texas School of Medicine indicates that A. F. Rowson, osteopath of Okmulgee, who is reported to have claimed graduation from that school, has never had any connection with it. A notice in the Okmulgee *Times-Democrat*, December 6, stated that Rowson graduated from the Texas school in 1926.

OREGON

Society News.—Dr. Stuart W. Harrington, Rochester, Minn., addressed the Portland Academy of Medicine, Dec. 10, 1931, on "Surgical Treatment of Pulmonary and Pleural Suppuration."——Dr. Grover C. Bellinger, Salem, addressed the Yamhill County Medical Society, McMinnville, Dec. 8, 1931, on "Diagnosis of Early Tuberculosis and Its Relation to Adult Tuberculosis."——Dr. Lyle B. Kingery, Portland, addressed the Columbia County Medical Society, St. Helens, Dec. 16, 1931, on "Differential Diagnosis of Oral Lesions." Dentists of the county were also present.——Among others, Dr. Ralph C. Matson addressed the Portland City and County Medical Society, Dec. 16, 1931, on "Treatment of Thoracic Empyema."

PENNSYLVANIA

Society News.—Dr. Ramon Castroviejo, Chicago, demonstrated a new method of corneal transplantation at the Pittsburgh Academy of Medicine, Dec. 28, 1931.——Dr. James D. Heard, Pittsburgh, gave an address before the Fayette County Medical Society, Uniontown, January 7, entitled "Why Collect Old Medical Books?"

Philadelphia

Physicians' Art Exhibit.—The Seymour Haden Society of the University of Pennsylvania Medical School held its second exhibit of the art work of its members, Dec. 23, 1931-January 2. Prizes given by Dr. Edward B. Krumbhaar, president of the society, were awarded as follows: first prize, Dr. Isolde T. Zeckwer, for etchings; second prize, Dr. Max M. Strumia, for oil paintings; honorable mention to Dr. Morton McCutcheon, for pastels, and to Dr. George M. Boyd, an invited exhibitor, for water colors. Physicians who are not connected with the university are invited to exhibit.

Illegal Practitioner Sentenced.—James B. Campbell, who is reported to have mulcted nearly a dozen persons out of approximately $1,000 in a few weeks of "practice," was recently sentenced to five years in prison. Campbell was arrested, Nov. 8, 1931, on a complaint from a woman who paid him $200 to cure her of "grippe and fallen arches." It appears that he declared that he was a graduate of the Philadelphia General Hospital and assured the woman he could cure all her ailments. Her brother also paid "Dr." Campbell $200 for treatment of a growth on his leg. Another man is reported to have paid Campbell $320 for "professional services," which consisted of an "injection" of iodine in the arm of the man's 15 year old son, who was suffering from nervousness. The "injection" was made with an ordinary sewing needle dipped in iodine. Judge Harry S. McDevitt of the Quarter Sessions Court, who imposed the sentence, branded Campbell as "one of those wolves who prey on the poor."

Society News.—Among speakers who will address the Philadelphia County Medical Society, January 13, will be Drs. Myer Solis-Cohen, on "Quinine Treatment of Pneumonia in Infants and Children" and Joseph V. Klauder, "Treatment of Ringworm, with Particular Reference to Hands and Feet."——Dr. John M. Fisher delivered the postgraduate seminar of the Philadelphia County Medical Society, January 8, on "Gonorrhea in the Female."——Dr. Béla Schick, New York, will address the Ex-Residents' Association of the Mount Sinai Hospital, February 3, on "Intestinal Toxicosis: Continuous Venoclysis."——Dr. Frederick R. Robbins addressed the Philadelphia Academy of Surgery, January 4, on "Intussusception with Special Reference to Resection of the Bowel."——Dr. John M. West, Allentown, addressed the Philadelphia Laryngological Society, January 5, on "The Intranasal Tear-Sac Operation from the Standpoint of the Rhinologist."——Dr. Simon Flexner, New York, addressed the College of Physicians of Philadelphia, January 6, on "The Poliomyelitis Epidemic of 1931."——Dr. Charles Geschickter, Baltimore, addressed the Philadelphia Roentgen Ray Society, January 7, on "Salient Features of Bone Tumors."——Drs. Catharine Macfarlane, Philadelphia, and Martha Elizabeth Howe, Fulton, N. Y., among others, addressed the Obstetrical Society of Philadelphia, January 7, on "Cancer Prophylaxis."

SOUTH CAROLINA

Society News.—Thomas R. Waring, newspaper editor, Charleston, addressed the Medical Society of South Carolina, in Charleston, Dec. 7, 1931, on the relationship of the press to medicine.——Dr. William A. Frontz, Baltimore, addressed the Columbia Medical Society in October on causes of hematuria. Dr. Frontz spoke on the same subject before the Urological Association of South Carolina, Oct. 12-13, 1931. Among other speakers at this meeting were Drs. Herbert M. Smith, Columbia, on "The State Hygienic Laboratory and the Urol-

ogist"; Leonard J. Ravenel, Florence, "Prostatic Diseases," and Dr. Frontz, "Importance of an Accurate Diagnosis in Treatment of Bladder Tumors."

TENNESSEE

University News.—Drs. Edward G. Thompson, William C. Colbert, Conley H. Sanford and Arthur F. Cooper have recently been advanced to associate professorships of medicine at the University of Tennessee College of Medicine, Memphis.

Health at Nashville.—Telegraphic reports to the U. S. Department of Commerce from eighty-two cities with a total population of 36 million, for the week ended Dec. 26, 1931, indicate that the highest mortality rate (19.1) appears for Nashville and the rate for the group of cities, 10.7. The mortality rate for Nashville for the corresponding week last year was 14.9 and for the group of cities, 12.1. The annual rate for the eighty-two cities for the fifty-two weeks of 1931 was 11.7, as against a rate of 11.9 for the corresponding weeks of 1930. Caution should be used in the interpretation of weekly figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or that they have large Negro populations may tend to increase the death rate.

Society News.—Dr. Frank H. Lahey, Boston, addressed the Nashville Academy of Medicine, Dec. 12, 1931, on "Present Status of Treatment of the Thyroid Gland."——Drs. Alexis F. Hartmann, St. Louis, and Henry Daspit, Jr., New Orleans, addressed the annual medical institute at Rutherford Hospital, Murfreesboro, Nov. 23, 1931, on "Physiologic and Chemical Aspect of Normal Renal Activity" and "Technic of Neurologic Examination," respectively.——Drs. Henry G. Rudner and Eugene M. Holder addressed the Memphis and Shelby County Medical Society, Nov. 17, 1931, on idiopathic hypoparathyroidism and acute surgical conditions in the abdomen, respectively.——Dr. Robert G. Reaves addressed the Knox County Medical Society, Knoxville, Dec. 22, 1931, on "The Present Status of the Management of Chronic Sinusitis."

VIRGINIA

Annual Graduate Course.—The Gill Memorial Eye, Ear and Throat Hospital, Roanoke, will hold its annual graduate course in ophthalmology, otology, rhinology, laryngology, facio-maxillary surgery, oral surgery, bronchoscopy and esophagoscopy, April 4-9. The faculty will include Drs. Edward H. Cary, Dallas, Texas; Lee Wallace Dean, St. Louis; Wells P. Eagleton, Newark, N. J.; Arthur J. Bedell, Albany, N. Y.; Matthew S. Ersner, Philadelphia; Lee M. Hurd and Webb W. Weeks, New York; Guy R. Harrison, D.D.S., Richmond; Jonas S. Friedenwald, Baltimore; Major George R. Callender, Washington, D. C., and the following resident physicians: Drs. Elbyrne G. Gill, John A. Pilcher, Jr., Booker Lee and Cecil L. Crump.

In **Memory of the Army's First Surgeon General.**—Memorial ceremonies at the grave of Dr. James Craik, first surgeon general of the United States Army and personal physician to George Washington, were held, Dec. 13, 1931, in Alexandria under the auspices of the Washington Society of Alexandria; other patriotic societies participated by placing wreaths on the grave. Dr. Robert U. Patterson, present surgeon general of the army, delivered an address on Craik as the father of the army medical service. Congressman Clyde Kelly of Pennsylvania and Josiah A. Van Orsdel, associate justice of the supreme court, also made addresses. This is said to be the first ceremony ever held in memory of Dr. Craik, who was born in 1731 in Scotland and died in 1814. Dr. Craik was one of the men who founded the Washington Society of Alexandria, Jan. 14, 1800, a month after the death of Washington. It is said that he was largely instrumental in exposing the Conway Cabal.

WISCONSIN

Society News.—Dr. Andrew C. Ivy, Chicago, addressed the Winnebago County Medical Society, Oshkosh, Dec. 18, 1931, on cholelithiasis.——The Ninth Councilor District Medical Society held its winter meeting, Dec. 10, 1931, in Marshfield, with Drs. William F. Braasch, Rochester, Minn., and Henry Schmitz, Chicago, as guest speakers, on "Urinary Antisepsis" and "Early Diagnosis of Cancer of the Uterus," respectively.——Dr. Frank E. Simpson, Chicago, addressed the Marathon County Medical Society, Wausau, Dec. 15, 1931, on "Radium Treatment of Carcinoma."——Dr. Abraham Levinson, Chicago, addressed the Milwaukee Pediatric Society, Dec. 9, 1931, on "Cerebral Hemorrhage of the New-Born."

Course in Urology.—To increase the general practitioner's knowledge in the field of urology, pathology and anesthesia, a series of one-day clinics is being conducted at the University of Wisconsin. Future dates are: February 2, March 1 and April 5. The morning programs include dry and operative clinics, demonstrations of various methods useful in practice, demonstrations of local anesthesia, and discussions of the pathology of genito-urinary diseases. Afternoons will be devoted to lectures. Among the lecturers will be Drs. Elmer L. Sevringhaus, on "Preoperative and Postoperative Management of Diabetes" and "Kidney Function Tests in Diabetes"; Robert Van Valzah, "Heart Disease as It Relates to Surgery"; William D. Stovall, "Routine Urinalysis as Applied to Clinical Diagnosis"; John B. Wear, "Surgical Anatomy of the External Genitals and the Perineum"; John W. Harris, "Obstetrical and Gynecological Problems Relating to Urology," and Walter J. Meek, Ph.D., "Urinary Secretion."

GENERAL

Prizes for Research in Psychiatry.—The New England Society of Psychiatry, at its next spring meeting, will make two awards, one of $100 and one of $50, to the writer or writers of the best papers published during the calendar year 1931 embodying research in psychiatry by a younger worker or workers. Physicians, psychologists, social workers or others are eligible. Writers who have once received an award are not eligible. Seasoned writers, senior physicians or heads of departments in which there are junior workers, while not inevitably excluded, will not generally be regarded as eligible for the awards. The work on which the papers are based should preferably have been done in New England or by workers now living in New England. Papers will be judged on the basis of their scientific quality. Reprints of articles or marked copies of journals in which the articles appeared should be sent before February 1 to Dr. Harlan L. Paine, secretary, North Grafton, Mass.

Plans for Grading of Nursing Schools.—Plans for continuing the work of the Committee on Grading of Nursing Schools for two more years were adopted at the semiannual meeting, Nov. 20-21, 1931. The committee has recently begun a second grading. Schools will be compared on a fairly large series of items in the hope of obtaining information sufficiently valid to permit it to be made available to prospective students and others interested. All schools that took part in the first grading two years ago will be invited to participate. It is believed that they may thus determine what progress they have made in the interim. Publicity will not be given to the results for individual schools, but the committee expects to make "educational comparisons," which may be made available to persons who ask for specific information. The committee is at present attempting to formulate minimum standards for schools of nursing. It is also preparing a handbook on the methods of grading evolved through its experience. Toward the end of 1933 the committee plans to publish a final report, which will set forth the problems of nursing education as the committee has found them and whatever recommendations it feels qualified to make leading toward the solution of the problems. Dr. William Darrach, New York, is chairman of the committee and May Ayres Burgess, Ph.D., is director.

Warning to Laboratories.—Dr. George R. Lacy, professor of bacteriology and immunology at the University of Pittsburgh School of Medicine, sends a warning concerning two men who obtained money from various persons at the university under suspicious circumstances during the week of Dec. 1, 1931. The men, one of whom gave the name George P. Crull, presented a card bearing the name of the "Scientific Instrument Service Company, 41 East Forty-Second Street, New York City." The names George P. Crull and Charles A. Foley appear on the card. The two men repaired some microscopes in the department of pathology and others at the Falk Clinic, Dec. 5, 1931. The following morning Crull borrowed $5 from the janitor of the clinic, saying that he had lost all his money the afternoon before. The next day, Dec. 7, 1931, he borrowed $5 from Dr. Thomas M. Mabon, promising to repay it as soon as he was paid by the clinic. Dr. Lacy and Dr. Mabon made special efforts to help him get his check from the clinic the same afternoon. After receiving it he disappeared, omitting to repay either Dr. Mabon or the janitor. Dr. Lacy subsequently wrote to the company named on the card describing the circumstances; his letter was returned. Crull is described as about 30 years old, about 5 feet 8 inches tall, of slender build, with slightly wavy, light brown hair. The other man, presumed to be Charles A. Foley, was slightly taller and also slender, and had straight black hair. They told Dr. Lacy that they had a large contract with Cornell University at Ithaca to repair microscopes.

Bequests and Donations.—The following bequests and donations have recently been announced:

Jefferson, Presbyterian and Pennsylvania hospitals and Hospital of the Protestant Episcopal Church, Philadelphia, $10,000 each, and Christ Hospital, Jersey City, N. J., $50,000, by the will of the late William H. Ishister.

Jefferson Hospital, Philadelphia, $16,000 by the will of Mrs. Emma A. Prince, to be used for surgical research.

Mount Sinai Hospital, $3,500; Hospital for Joint Diseases and Montefiore Hospital, $1,000 each, all of New York, by the will of the late Mrs. Leonie Mansfield.

Presbyterian Hospital and the French Hospital, New York, $2,000 each by the will of the late Edward Bement.

Hospital for Joint Diseases and Beth Israel Hospital, New York, $1,000 each, by the will of Mrs. Frances Blumenthal.

Lankenau Hospital, Philadelphia, $5,000 by the will of Mrs. Julia Class, Merion, Pa., the income to be used in cancer research.

Pennsylvania Hospital, Philadelphia, $5,000 by the will of the late William Gerstley.

Eagleville Sanatorium, Eagleville, Pa., and Jewish Hospital, Philadelphia, received contingent bequests of $150,000 by the will of the late Louis Gerstley. The hospitals are to receive the money in the event Mr. Gerstley's children die without issue before the death of his widow.

Palmerton Hospital, Palmerton, Pa., $15,000 for the children's ward by the will of Mrs. Josephine V. Remmel.

The aid association of the Philadelphia County Medical Society received the residuary estate of Dr. Charles Harrod Vinton, plus an additional $5,000.

Skin and Cancer Hospital, Philadelphia, $120,000 to expand its activities, from anonymous donors.

Jefferson Hospital, Philadelphia, $10,000 for the endowment of two beds in the genito-urinary ward, by the will of Mrs. Lillian E. Loux, widow of Dr. Hiram Rittenhouse Loux.

Roosevelt and St. Luke's hospitals, New York, $10,000 each by the will of the late Maud Aguilar Leland.

Presbyterian Hospital, New York, $5,000 by the will of J. Herbert Johnston.

St. Luke's Hospital, $50,000, and Hospital for Ruptured and Crippled, New York, $5,000, by the will of Mrs. Julia Shaw. Both gifts are contingent.

Lenox Hill Hospital, New York, and St. Agnes Hospital for Crippled Children, White Plains, N. Y., $1,000 each by the will of Henry Heide.

Society News.—Dr. Edmund S. Boice, Rocky Mount, N. C., was elected president of the Seaboard Medical Association at its meeting in Suffolk, Va., Dec. 1-3, 1931. Among others, Dr. Warren F. Draper, state health officer, Richmond, addressed an open meeting on "Every-Day Health Problems." Drs. David T. Tayloe, Jr., and Dewitt Kluttz, Washington, D. C., presented a paper on gallbladder disease. The 1932 session will be held in Rocky Mount.——The second International Congress of Tropical Medicine, which was to have been held in Amsterdam, September 12-17, has been postponed.——The American Association for Thoracic Surgery will meet, April 18-20, at Ann Arbor, Mich.——Dr. J. Robert Simpson, Miami, Fla., was elected president of the Association of Seaboard Air Line Railway Surgeons at its annual meeting in Miami, Dec. 8-10, 1931.——Health education is among the topics listed for discussion at the regional conference of the World Federation of Education Associations, to be held in Honolulu, T. H., July 25-30.——The ninth annual meeting of the American Orthopsychiatric Association will be held, February 18-20, in Baltimore.——The National Aero Medical Association will hold its next meeting in Cleveland in September.——The annual meeting of the Association for Research in Nervous and Mental Disease was held, Dec. 28-29, 1931, in New York. The first day was devoted to a symposium on poliomyelitis and epidemic encephalitis; the second, to a symposium on meningitis. Among the speakers on the first subject were Drs. David Orr, Edinburgh, Scotland; Foster Kennedy, New York; William Lloyd Aycock, Boston; William H. Park, New York; Edward C. Rosenow, Rochester, Minn., and Hans Zinsser, Boston. Among those who presented papers on meningitis were Drs. John A. Kolmer, Philadelphia; John E. Gordon, Detroit, and George W. McCoy, Washington, D. C. Dr. Samuel T. Orton, New York, was elected president; Drs. George B. Hassin, Chicago, and Wilder G. Penfield, Montreal, were elected vice presidents, and Thomas K. Davis, New York, secretary.——At a meeting of the Tri-State Medical Society, composed of the officers and directors of the medical societies of New York, New Jersey and Pennsylvania, addresses were presented as follows: Dr. William R. Davies, Scranton, Pa., "Looking at Both Sides of Our Public Relations"; Dr. Edward G. Waters, Jersey City, N. J., "A Plan for Proper Accrediting and Control of Specialists and Specialism by State Medical Societies," and Dr. Thomas J. Harris, New York, "Can the Qualifying and Certifying of Specialists Be Conducted by National Examining Boards and the Colleges of Surgery and Medicine?"

Medical Bills in Congress.—S. 1601, introduced by Senator Bratton, New Mexico, proposes further to extend the benefits of hospitalization under the World War Veterans' Act to certain veterans of the Spanish-American War, the Philippine insurrection and the Boxer rebellion. S. 2007, introduced by Senator Metcalf, Rhode Island, proposes to authorize the erection of a veterans' hospital in Rhode Island. H. R. 454, introduced by Representative Rudd, New York, proposes to bring within the purview of the World War Veterans' Act honorably discharged men of the Army, Navy, Marine Corps, Fleet Reservists and retired officers and enlisted men. H. R. 5340, introduced by Representative Mitchell, Tennessee, proposes to authorize the erection of a veterans' hospital in middle Tennessee. H. R. 5619, introduced by Representative Martin, Massachusetts, proposes to authorize the erection of a veterans' hospital in southeastern Massachusetts or Rhode Island. H. J. Res. 21, introduced by Representative Celler, New York, H. R. 4643, introduced by Representative Sabath, Illinois, and H. R. 5608, introduced by Representative Boland, Pennsylvania, propose to amend the National Prohibition Act, as supplemented, to remove certain restrictions imposed on physicians with respect to the prescribing of medicinal liquor. S. 206, introduced by Senator Howell, Nebraska, proposes to recognize "the high public service rendered by Dr. A. S. Pinto, and the bravery displayed by him, in connection with the discovery of the cause and means of transmission of yellow fever." S. 1975, introduced by Senator Sheppard, Texas, proposes to amend an Act entitled "An Act to recognize the high public service rendered by Major Walter Reed and those associated with him in the discovery of the cause and means of transmission of yellow fever" by including Roger P. Ames among those honored by the act. S. 1696, introduced (by request) by Senator Reed, Pennsylvania, proposes to amend the World War Veterans' Act to provide, among other things, for compensation for veterans suffering from injury or disease due to wilful misconduct. H. R. 5653, introduced by Representative Norton, New Jersey, proposes to authorize pay patients to be admitted to the contagious disease ward of the Gallinger Municipal Hospital, District of Columbia. H. R. 5655, introduced by Representative Shott, West Virginia, proposes to provide for federal cooperation with the states and territories in the physical rehabilitation, education, vocational guidance, and vocational education of physically handicapped persons below the age of 21 years who by reason of physical defects or infirmities are or may be expected to be totally incapacitated in educational and vocational activities expected of normal persons.

FOREIGN

Anniversary Celebration Postponed.—The celebration of the two hundred and fiftieth anniversary of the founding of the Royal College of Physicians of Edinburgh, planned for St. Andrew's Day, November 30, was postponed to a future date to be determined by the college.

Cholera in Persia.—A cholera epidemic is understood to be raging in southern Persia throughout the region that includes the Anglo-Persian Oil Company district, according to the Chicago *Tribune*. Iraq had in October an epidemic of 1,960 cases listed, with 1,203 deaths, it is reported.

Courses in Berlin.—International medical graduate courses to be given in Berlin during March and April, through the cooperation of the Lecturers' Association and the Kaiserin Friedrich-Haus, include the following: internal medicine (February 29 to March 3); diseases peculiar to industrial workers with special regard to medical supervisors' activities (March 7-14); obstetric-gynecologic graduate week (March 14-19); surgery (April 4-9); roentgen-ray course (April 10-17). Single courses in all fields of medicine are given monthly. For the autumn of 1932, courses are planned in internal medicine, surgery of the thorax, ophthalmology, psychotherapy and tuberculosis. Further information may be obtained from the Kaiserin Friedrich-Haus, Berlin NW 6, Luisenplatz 2-4.

Association for the Prevention of Blindness.—At the general assembly of the International Association for the Prevention of Blindness, Nov. 14, 1931, in Paris, Prof. de Lapersonne, France, was reelected president of the executive committee, and Dr. F. Humbert, Switzerland, reelected secretary general; other members of the committee were also reelected. It was announced at this meeting that, in the near future, a permanent secretariat will be established. Dr. Cridland, Great Britain, speaking on "Value of a Complete Investigation of the Causes of Blindness as a First Step in Prevention," suggested that, before undertaking a propaganda campaign, better knowledge be obtained of the most frequent causes of blindness; he advocated uniform statistics on the causes of blindness in the different countries. This suggestion was accepted. Dr. F. Park Lewis, Buffalo, vice president of the association, among others, spoke on "Certain Rare Forms of Cataract of a Parasitic Nature Observed in Fish."

University News.—The formal opening of King's College Hospital Medical School, Denmark Hill, October 1, was of special interest, according to the *British Medical Journal*, because the school is just completing the first hundred years of its existence. Mr. Herbert Willoughby Lyle, the dean, who is shortly retiring from the office, in his report pointed out the

growth of the new King's College Hospital from its opening in 1913 with between 50 and 60 students, until the present with an enrolment of 303. Discussions at the opening covered a history of the school in the hundred years of its existence.—— A chair of child life and health has recently been created at Edinburgh University, with Prof. Charles McNeil as the first occupant. In his inaugural address Professor McNeil called attention to the name of the chair, which includes not only diseases of children but the child himself, indicating the wider scope of the physician's practice with children. A new chair in psychology has also been established, with Prof. James Drever as the first incumbent.——Dr. John S. Young, lecturer in experimental pathology and assistant director of cancer research, University of Leeds, England, has been appointed Musgrave professor of pathology at the University of Belfast.

Government Services

U. S. Public Health Service

Surg. Clarence H. Waring, relieved at Washington, D. C., and assigned at Minneapolis; Asst. Surg. Jack G. Mearns, relieved at marine hospital, Chicago, and assigned at marine hospital, San Francisco; A. A. Surg. Percival E. Faed, relieved at Rolla, Mo., and assigned at Gainesboro, Tenn., in connection with prevention and eradication of trachoma; Asst. Surg. John G. Hewitt, relieved at Washington, D. C., and assigned at marine hospital, Stapleton, N. Y.; Surg. Mark V. Ziegler, relieved at Minneapolis, and assigned to duty at Raleigh, N. C., for the purpose of cooperating with the state health officer in studies of demonstrations on rural sanitation; P. A. Surg. Fortunat A. Troie, relieved at Ellis Island, N. Y., and assigned to duty in Washington, D. C.; P. A. Surg. Langdon R. White, relieved at Washington, D. C., and assigned to duty at Helena, Mont., as district director in the Indian Medical Service; Sr. Surg. Carlisle P. Knight, relieved at New London, Conn., and assigned to duty at Rosebank, S. I., N. Y.; P. A. Surg. Edgar W. Norris, relieved at Rosebank and assigned to duty at Quarantine Station, Honolulu, T. H.; Acting Asst. Surg. Antonio Mayoral, Jr., relieved at Ponce, P. R., and assigned to duty at marine hospital, Stapleton, N. Y.; Surg. Robert W. Hart, relieved at Manila, P. I., and directed to proceed, on the arrival of his successor, to the marine hospital, San Francisco; Eddie M. Gordon, Jr., promoted and commissioned as passed assistant surgeon in the regular corps of the U. S. Public Health Service, effective November 1.

American Scientific Mission in Haiti

In accordance with an agreement between the United States government and Haiti, signed, August 5, Haiti assumed definitely the administration and control of the national public health service of that country, October 1. However, the agreement provided for the establishment of an American Scientific Mission to act as advisers to the Public Health Service of Haiti and control the sanitation in the cities of Port-au-Prince, including the suburb Petionville, and Cape Haitian, where American troops (marines) continue to be stationed, pending other arrangements and until the conclusion of a protocol for their evacuation. The American Scientific Mission consists of Capt. Montgomery A. Stuart, medical corps, U. S. Navy, director, and eight other naval medical department members of the Public Health Service of Haiti.

The Government Needs Physicians

An open competitive examination has been announced for the position of junior medical officer (intern) to fill vacancies in St. Elizabeth's Hospital, Washington, D. C. Applications must be on file with the manager of the fourth U. S. Civil Service District, Washington, D. C., not later than January 19. The entrance salary is $2,000 a year, less $60 a year for quarters. Competitors will not be required to report for examination at any place but will be rated on their education, training and experience. Applicants must have been graduated from a medical school of class A standing with the degree of doctor of medicine for internship not prior to Jan. 1, 1931, and for graduate internship in psychiatry not prior to Jan. 1, 1930. Full information may be obtained from the secretary of the U. S. Civil Service Board of Examiners at the postoffice or customhouse in any city or from the U. S. Civil Service Commission, Washington, D. C.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 5, 1931.

The Mechanism of Pain

Dr. E. D. Adrian, F.R.S., Foulerton research professor of the Royal Society, described in his Croonian lecture the progress made by himself and others in knowledge of the mechanism of nerve conduction by means of improved technic. By using the triode amplifier it is possible to record the change of a few microvolts due to the independent action of each nerve fiber when a motor nerve is stimulated electrically. This delicate method has been applied to sensory nerves, and remarkable but not yet conclusive results have been obtained. The difficulties of interpretation are considerable because pain involves a psychologic factor. Head showed many years ago that there are undiscriminating areas in the human skin that do not respond to the stimulus of hot water until a critical temperature is approached, when the result is a violent reaction. The temperature was close to that at which protoplasm is coagulated, and Head suggested that the reaction was a deep-seated protective mechanism, without any feeling of pain, probably dating back to the early stages of evolution when a marine animal had to escape rapidly from a dangerous temperature. By experiments on his own arm, in which a nerve had been severed, Head showed that different constituents of sensory nerves had different functions.

By experiments on decapitated frogs, Adrian has shown that stimuli such as gentle brushing, pressure and application of hot water to the skin produce sensations that travel slowly along certain fibers and more rapidly along others. The slow fibers conduct stimuli which, if applied to man, would produce pain. The area supplied by the slow fibers corresponds rather closely with the area supplied by the fast fibers, and after a stimulus amounting to severe injury of the skin the discharge continues for several minutes, corresponding to human experience of pain from such injury. The inference is that stimuli carried by the slow fibers in the frog produce pain or its physiologic accompaniments. Electrical stimulation of mammalian nerves reveals a slow group of fibers, corresponding to those in the frog. Adrian infers that the slow system behaves in the same way in the two sets of animals, responding only to intense stimulation. On the other hand, it seems equally clear that the rapid fibers also carry pain and that there is no single afferent system for pain.

The mechanism of touch is different. It has a different pathway from that for pain. The rapidity and individuality of each pathway for touch prevent any summation of the effects due to each impulse, so that the sensation cannot rise to high intensity. The central nervous system offers many examples of spatial summation (from convergence) and temporal summation (from persistence of the effect left by each impulse). Convergence favors the building up of intense activity but at the expense of localization, for the message loses its individuality when it enters the common path. Slow decline of the effects produced by each impulse will favor intensity. Therefore poor localization and a slow rise and decline should characterize any sensation capable of rising to the highest intensity. These are usually features of pain.

Libraries in Hospitals

A new scheme for putting the library service for hospitals throughout the country on a permanent basis has been drawn up by the British Red Cross Society Hospital Library, in cooperation with a special subcommittee of the Library Association. Under this scheme the British Red Cross Library,

which has been supplying 2,000 hospitals throughout the country with books, will perform a similar service for the infectious disease hospitals and sanatoriums, the psychopathic hospitals, the British hospitals overseas, the naval, military and air force hospitals, and the hospitals for ex-service men. Books are now looked on as part of the curative treatment of hospitals, and the establishment of hospital libraries is growing rapidly. From the Red Cross Hospital Library in London 6,000 books go out every week and never return but are used to add to existing hospital libraries or to form the nucleus of new ones. Books on every conceivable subject and in virtually all languages are asked for and supplied, even those written in Swahili and in Chinese.

Abortion and Birth Control

A well known judge, Mr. Justice McCardie, tried two married women at the Leeds assizes for procuring their own miscarriage. "In my view," he said, "the knowledge of birth control ought to be most widely extended and particularly among those who live in very poor and unhappy circumstances. The law of abortion, as it exists, ought to be substantially modified. It is out of keeping with the conditions that prevail in the world today. Here is a woman of most excellent character, brave in the midst of sorrow and much burdened. She has had seven children born in poverty, reared in poverty, almost doomed to poverty for their lives. She had no money; her husband was lazy and earned nothing. The burden fell on her. She was tired out with this burden of bearing children to a husband who would not support them. They were living on charity." The judge bound over the women in both cases, instead of sentencing them, and added: "I think it should be recognized that we live in the world of 1931 and not in the medieval world." However, the late home secretary, Lord Brentford, clergymen and others have expressed disapproval of the judge's views and suggested that he should confine himself to his proper functions.

Scheme for Specialists' Services at Reduced Fees

The Hospital Saving Association arranges that poor people can obtain hospital treatment when they may require it, by making regular small contributions to the hospitals. The association has brought forward a scheme to provide outside the hospitals specialist services for its members at the reduced fee of $5, on recommendation of the contributor's physician. A list of specialists willing to act in this way was to be compiled, and the scheme was submitted to the British Medical Association. The association felt that, while the Hospital Saving Association was a movement deserving of support, a closed or restricted panel created and controlled by a nonmedical authority could not be approved. The British Medical Association met representatives of the Hospital Saving Association and stated its objection, intimating that, provided adequate support was forthcoming from the profession, it would be prepared to establish a panel of specialists. The Hospital Saving Association agreed to this. It has been suggested that ample provision already exists in the readiness of a specialist to see a patient, if recommended to him by a physician as suitable, at a reduced fee. But the association does not consider that this meets the situation. In such an arrangement there is necessarily the element of charity, and the Hospital Saving Association members do not want charity. They want to pay for the service if terms can be arranged that they can afford. Moreover, though physicians do not mind occasionally asking for special terms, they dislike doing it often. Further, the scheme would probably lead many persons who now obtain the specialist service required gratuitously at hospitals to pay the reduced fee at the consultant's office. The British Medical Association has therefore summoned a meeting of the specialists in the London area to consider the scheme. If the meeting agrees to the scheme, the British Medical Association proposes the following: 1. A consultants' board shall be constituted, containing representatives of the Royal Colleges of Physicians and Surgeons and the British College of Obstetricians and Gynaecologists, in whose discretion will lie appointment to the panel. 2. The names will be arranged alphabetically under the headings physicians, surgeons, gynecologists, dermatologists, otorhinolaryngologists and radiologists, practitioners in any division to be permitted to have added to their names indications of their specialties. 3. For admission to the panel one or more of the following criteria must be satisfied by the practitioner: (*a*) hospital or other appointments affording special opportunities for acquiring special skill and experience of the kind required for the performance of the service to be rendered, and actual recent practice in performing the service; (*b*) special academic or postgraduate study of a subject which comprises the service, and actual recent experience; (*c*) generally recognized special proficiency and experience in a subject which comprises the service rendered.

Criticism of Pasteur Methods: "Adjection"

In his Huxley lecture at Charing Cross Hospital, Sir Almroth Wright, F.R.S., described Pasteur as the first original thinker on immunization, since Jenner was only a second edition of Lady Mary Wortley-Montagu. But it was time to think out the problems of immunity afresh. They were far more important than in Pasteur's day, because Pasteur thought of vaccines only for prophylaxis; in other words, for epidemic diseases. The study of immunization had now been greatly extended. By the process introduced by the lecturer, under the name of vaccinotherapy, vaccines were used for the treatment of an open wound and for all diseases. One of the principles of Pasteur was that, to obtain an effective imitation of the original disease, the microbe must be employed living. This was still a principle of the Pasteur Institute. But in the four great diseases typhoid, cholera, plague and pneumonia it had been shown by the lecturer and others that inoculation with the dead microbe was as successful as with the living. Dead microbes should not be used when there were not enough of them available or when one could not get good results with them. In vaccination against smallpox, dead material was not employed because the virus could not be grown. But the Pasteur Institute adhered to the use of living microbes for love of the old doctrine. It still inoculated against rabies with the living microbe, though many workers elsewhere now used dead material, so as to avoid the possibility of infection. Again it was held in France that it was impossible to treat tuberculosis with dead microbes. The lecturer considered this a mistake, but Calmette, the subdirector of the Pasteur Institute, used a weakened form of living tubercle bacillus, and mishaps reported from it were attributed by Calmette to the use of a wrong culture by mistake. It was manifestly best that any risk should be eliminated.

Two other of Pasteur's principles Sir Almroth Wright described as particularly important. One was: "Vaccination is applicable only to the uninfected." In later life Pasteur relaxed this rule in one respect: when there was a long incubation period he inoculated in the interval and successfully. Wright's own conclusion was: "We can inoculate anybody, infected or not infected, provided that his body does not already contain the maximum dose and he has still the power of responding." By virtue of this principle of "adjection" one could add as many microbes to the living microbes in the body as would form in combination the proper dose. The other important rule of Pasteur was that "the value of the immunizing procedure can be decided only by statistical tests," the principle of statistical experiment. Though every physician paid lip service to this doctrine there were no medical statistics of treatment in reality, for it was impossible to leave half the patients in hospitals

untreated to serve as controls for the others. All that a physician could do was to form a general impression from his memory of what happened in one case after another. The alternative was something that physicians like much less: to do an experiment in the laboratory. When Wright did his work on typhoid inoculation, as a substitute for statistical results, he tested the effect on the blood. This was the method of laboratory experimentation, out of which would come a new decalogue, now in the making, that would replace Pasteur's.

PARIS

(From Our Regular Correspondent)

Nov. 25, 1931.

French Congress of Otorhinolaryngology

The forty-fourth French Congress of Otorhinolaryngology closed the series of congresses that have succeeded one another in Paris during the past season. The chief topic on the program was bronchoscopy, on which Messieurs André Bloch and A. Soulas presented a comprehensive paper, pointing out that the progress made in recent years in instrumental technic has made it possible to extend the domain of this mode of investigation. They described the indications and the contraindications. Bronchoscopy is a procedure of the greatest importance in the diagnosis of thoracic disorders of all kinds, in the securing of secretions or of fragments of tissues for research or biopsies, for repair work and the extraction of foreign bodies, and for treatment—even the treatment of lung abscesses. Léon Kindberg, Robert Monod, Guisez, Jacques, and Fernand Lemaître presented unofficial contributions on the subject. Le Mée emphasized particularly the value of aspirations of secretions with the aid of a syringe, and of injections of iodized oil for roentgenologic diagnosis. Among the unofficial communications were several especially interesting. Van Nieuwenhuyse of Roubaix made use in cranial surgery of bird muscle, which is employed today as a hemostatic. He uses the dried muscle reduced to a powder, and he has secured excellent results. Mr. Caboche discussed cellulitis in otorhinolaryngology as a cause of craniofacial algias that may simulate a sinusitis or an otitis. Mr. Helsmoortel of Antwerp spoke on applications of diathermocoagulation to otorhinolaryngology; also Professor Jacques of Nancy considered that subject. Mr. Bonain of Brest gave the results of an interesting research on the structure of the organ of Corti, supporting his statements on observations made on animals by the fixation in a living state of the ciliated cells, which cannot be studied to advantage in man owing to the changes that the cadaver undergoes. Contrary to accepted theory, he does not think that the differentiation of sounds in the labyrinth is accomplished by radial fibers in the vestibule, which are said to be the equivalent of the strings of a piano tuned in advance to produce the various tones. He considers that these fibers are stimulated differently by the sound vibrations, and more or less profoundly, depending on their number and their wavelength. Mr. Portmann spoke on the treatment of phlebitis and of sinusojugular thrombophlebitis, a subject that was likewise considered by De Stella of Ghent and Professor Jacques of Nancy. Maurice Jacod of Lyons dealt with the relations of colibacillosis to the congestive disorders of the ear, such as buzzing sounds and dizziness, which colibacillary vaccines cause to disappear. An interesting discussion arose on syphilis of the middle ear, which was participated in by Mr. R. Mayoux and Messieurs Dutaillet de Lamothe, Hennebart and Bourgeois.

Diminution After Influenza of Acquired Immunities

It is well known that influenza leaves the organism in a state of anergy, which may facilitate the outbreak of other disorders. In this connection, Mr. Le Bourdellès communicated to the Société médicale des hôpitaux the instructive history of an epidemic of measles among adults, in which the proportion of recurrences was 40.8 per cent. In a satellite epidemic of mumps, the proportion of recurrences reached 14 per cent. These epidemics developed in association with a recurrence of influenza, and the author holds that the weakening of the naturally acquired immunity must be interpreted as an epidemiologic consequence of influenzal anergy. This weakening of immunity under epidemic conditions is further explained by recurrences of short duration (less than a year). The duration of the incubation of recurrent measles appeared, in certain cases, very short, which seemed to justify the regarding of the second attack as a manifestation of allergy. Research on the subject thus far points rather to an indirect mode of action of influenzal anergy, an epidemiologic factor of microbic hypervirulence rather than a modification of terrane.

The Prenuptial Certificate

Legislation requiring persons about to enter on the marriage relation to present a medical certificate attesting that they are not affected with any venereal disease in an active state, or organic lesions likely to prove fatal within a short time, has been demanded for many years by the eugenic congresses but no such legislation has as yet been passed in France, although a bill was presented to parliament by Professor Pinard while he was a member of the chamber of deputies. The physicians themselves are not always in accord on this point; for they fear that the application of this idea, which is excellent in theory, may lead to the violation of the right of privileged communication between physician and patient. The administrative council of the Syndicat des médecins de la Seine, after discussing the subject at considerable length, recently formulated its opinion by the following resolution, which was communicated to the press:

> It is of social importance that, before entering on the married state, the contracting parties of both sexes submit to a medical examination. The matter is so important that it deserves to be made a subject of legislation that will make such an examination compulsory. Future spouses will be required to consult the physician of their choice. The consultation thus given will remain strictly confidential and will be verbal, the practitioner confining himself to a certificate in which he will state merely that such an examination was made on a given date. The physicians are by no means opposed to making a prenuptial consultation obligatory provided the examination remains strictly secret with no written attestation as to the state of health or the aptitude for marriage.

Intoxication of Inhabitants of Lyons by Industrial Gases

An accident that calls to mind the catastrophe caused, three years ago, in Belgium by the death-dealing fogs has just occurred in Lyons, although the consequences were less grave. Within a few minutes, a section of the city in which there were many factories and in which many workmen resided found that its atmosphere had become irrespirable. The people suffered from attacks of choking and coughing. The police interrupted all street traffic and ordered all the doors and windows closed. Several cases of bronchitis with choking developed in children, but no deaths occurred. An inquiry soon showed that emanations came from a factory on the banks of the river, in which various chemical products were manufactured and which produced stannic chloride, employed in the manufacture of silk goods, silk weaving being the principal industry of Lyons. This salt is obtained by the direct action of chlorine on tin, the operation being carried on in a closed vessel, because, in the open air, vapors of hydrochloric acid are produced. During the absence of the workman, a leak developed in a lead joint, and the gas as it escaped attached itself to the droplets of water composing the fog that enveloped the city. The inquiry instituted by the prefect of the department of Rhone resulted in an order prohibiting the manufacture of this product within the city limits, which made it necessary for the factory to seek a new site outside the city. At the time of the accidents that occurred in the Meuse Valley, which cost the lives of sixty persons, the noxious gas was sulphurous anhydride, emitted by

the numerous factories in this valley, which is enclosed on all sides and very winding, poorly swept by the wind and subject to frequent fogs. The Belgian inquiry resulted in the suggestion that work in the factories be interrupted on foggy days. One village (Engis), in which the general mortality has been constantly increasing during the past ten years, is threatened with the necessity of closing all its factories.

BERLIN

(From Our Regular Correspondent)

Nov. 23, 1931.

The Number of Infirm Persons in Germany

The results of the enumeration of infirm persons, which was made in 1925-1926, were not published until recently. The enumeration included not only blind persons, deafmutes and mental patients but also the deaf and persons with other bodily infirmities. The report gives the total number of blind persons as 33,192, or 5.3 per 10,000 of population. The incidence of males is much higher because of the many persons who became blind during the war; but even after deduction of the 2,307 war blind, the incidence of the male sex is still somewhat higher, as has been the case in former statistics. Since the census of 1900, the number of blind persons has increased considerably. Children under 5 years of age and aged persons are most likely to become blind. The number of deafmutes was 31,670. There were 6 males and 5.1 females per 10,000 of population. In about half, the impairment is congenital. Of the deafmutes aged 7 to 20, 88 per cent had received instruction in institutions for the care of deafmutes; of those aged 20 to 40, 82 per cent had had such instruction, and of those above age 40, 64 per cent. Of the deafmutes above age 20, 82.2 per cent of the men were gainfully employed, mostly as tailors, shoemakers and cabinet makers; of the women, 36.5 per cent were employed, chiefly as seamstresses. Of deaf persons who could not hear spoken words even with the aid of an ear trumpet, 8,755 were enumerated, 814 of whom were war injured. Their number was higher in the older age groups; 45 per cent were still gainfully employed: 66.4 per cent of the men and 21.5 per cent of the women. The number of persons with serious bodily infirmities was 276,467; 190,495 men, or 86.4 per 10,000 of population, and 85,972 women, or 29 per 10,000. Even after deducting the 82,972 war injured, the men were still in the majority, chiefly because of the hazards of industry, in the wider sense. The number of persons with slight bodily infirmities was 116,974; 89,784 males (among which were 45,007 war injured) and 27,190 females. The number of persons with mental impairment was 207,514; 105,374 men, including 6,090 war injured, or 37.9 per 10,000 of population, and 102,140 women, or 34.4 per 10,000.

Decrease in Consumption of Luxuries

In Germany the consumption of luxury articles has declined but fortunately the consumption of necessary foods has remained steady. In fact, the amounts consumed per person are in some instances above those of 1913. The articles of consumption chiefly affected by the decline are coffee, tea, cocoa, beer, cigars and cigarets. Unemployment and reduction of income have brought about considerable retrenchment. The average monthly consumption of beer during the second quarter of 1931 was only 39,000,000 hectoliters as compared with 49,000,000 hectoliters during the same period of the previous year, the decline being 20 per cent. The consumption of cigarets has declined 46 per cent. During the second quarter of 1931, the average monthly consumption of cigarets was 15,000,000,000 as against 28,000,000,000 during the corresponding period of 1930. Also the consumption of smoking tobacco during the second quarter of 1931 was 11 per cent less than in 1930. A quantitative decrease in meat consumption, which might have been expected as a result of the reduction in incomes, was prevented by the drop in meat prices. The meat consumption was 3.4 per cent above that of 1913 and 12.8 per cent above that of the depression year 1926. There was a slight decline in the consumption of bread, and especially of rye bread. The consumption of potatoes has not increased, even in recent months. Precisely potato consumption as a substitute for articles of higher food value (compare conditions during the war) is regarded by economists as a true measure of the status of the food consumption.

Romanticism in Medicine

Medicine is generally regarded as a science that is based on observation and experience and hence affords no opportunity for philosophy in the form of speculative constructions. In contrast with this widespread conception, Professor Diepgen, an authority on the history of medicine, at the University of Berlin, brought out, at a well attended session of the Berliner Medizinische Gesellschaft, to what extent medicine is permeated with irrational ideas, which, in the early Christian era, took on their philosophic dress through the teachings of the Neoplatonists. These ideas, throughout the middle ages, were disseminated by such eminent physicians as Arnald von Villanova and Paracelsus, and, after a temporary vogue during the period of the Romantic school, are preparing to invade under various guises modern medical thought. All these ideas have, in their longing for a transition from knowledge to belief, a common origin that impresses on all of them the stamp of romanticism. The speaker would not attempt to deny that philosophy, so far as it is based on the firm ground of experience, may be extremely valuable for the medical man, owing to its significance with reference to the fundamental theories as to the basis of pure scientific knowledge and through the aid it lends by the formation of new biologic and pathologic notions. But, in view of the complete failure of romanticism in medicine, he utters a warning against the increasing attempts to substitute synthesis and intuition for the path of analytic research laboriously achieved; to dispense with strictly scientific special researches in the quest for more detailed knowledge and to rely on philosophic conclusions drawn from the totality of events, and to attach undue importance to unscientific conceptions in medicine whose sole basis may be popular belief. These expository statements of Diepgen received an exemplification through Dr. Franz Bruck, who in his address on "Spontaneous Healing and Suggestion" pointed out that the therapeutic value of hypnosis and suggestion had been greatly overestimated, and that in numerous cases a cure is effected through the patient's own power of recovery, especially if receiving rational support from the physician.

The Seventieth Birthday of Prof. August Bier

November 24, Prof. August Bier, director of the Berliner Chirurgische Universitätsklinik, will celebrate his seventieth birthday. Professor Bier's career has been out of the ordinary. His marked ability as a teacher came near being lost to the world; for he had established his abode in a country of South America as a general practitioner, when he was called to the University of Kiel as assistant to von Esmarch. After an eminently successful period as assistant, during which he introduced the method of spinal anesthesia, he was summoned to the University of Greifswald as the successor of Hellferich, and soon afterward to Bonn as the successor of Scheede. In Bonn, Bier refused without hesitation a call to the University of Vienna.

From the beginning, Bier encountered much opposition at the hands of the "guild." He did not have the support of a head professor willing to back him against all comers; yet, in 1907, although his name was not among those proposed by the faculty of medicine, he was called to Berlin to enter on the heritage of Dieffenbach, Langenbeck and von Bergmann. Nor

did the ardent combating of his ideas and research on the part of colleagues cease after going to Berlin. This opposition served only to increase his energy and his combativeness. An illustration is the introduction of Bier's passive hyperemia for the treatment of surgical infections, and, particularly, gonorrheal metastases to the joints, which is today still regarded as the best form of treatment.

It is difficult to point out the fundamental features in Bier's character. Some are inclined to term him a "physiologic surgeon." He was always conscious of the fact that an operation constitutes a serious invasion of the whole organism, and hence he regarded every surgical operation as a necessary evil. He always emphasized to his students that a surgical operation is in a sense an attack on the health of the patient. Long after completion of their studies, students showed fondness and respect for their teacher, who by a simple and friendly manner, and a remarkable talent for imparting knowledge, kept in close touch with his audience. He was always opposed to diagnostic methods that involved any injury to the body. For instance, he would not permit the use of the pneumoperitoneum in his clinic. If a scientific experiment was associated with any dangers, he applied it first to himself. He was the first person in Kiel to be subjected to lumbar anesthesia—an heroic act that endangered his life for a few days. Mutilating operations were very displeasing to him; for instance, castration or the excision of a tuberculous joint. Operations that, by reason of their topographic anatomy, appeared to offer the patient no chance of recovery, Bier would not perform after they had proved unsuccessful several times in succession; for example, the operations for the removal of a cancer in the thoracic portion of the esophagus.

In addition to these trail-blazing performances, to mention only lumbar anesthesia, passive hyperemia as a mode of treatment, and his researches on the theory of inflammation and regeneration, Bier, although bitterly attacked for his views, was a man universally honored for his personality, by the Berlin faculty of medicine. He took an optimistic view of everything and served to stimulate the hearts and minds of those about him. By his devotion to duty, he served as an example to students, and awakened in them a sense of loyalty toward the profession. Hence, it is all the more tragic that Bier will be unable to turn over to a successor the famous clinic that he directed so successfully. As mentioned in a previous letter, the clinic is to be closed, April 1, for lack of available funds to operate.

ITALY

(From Our Regular Correspondent)

Oct. 31, 1931.

The Medical Academy of Rome

The Accademia medica di Roma held its regular session recently under the chairmanship of Professor della Vedova. Professor Parisotti spoke of the eye as the index of the general constitution of the human body. His research indicates that the hypermetropic eye, which always has an imperfect development, is an indication of constitutional weakness due to defects and deviation of hormones.

Professor Maselli spoke on hypersensitivity to epinephrine associated with arterial hypertension. The speaker studied patients with various types of arterial hypertension. This property is more marked in patients with chronic nephritis. The blood serum of these patients was found capable of causing in healthy subjects a hypersensitiveness to epinephrine that did not previously exist. The observation was made twelve times out of sixteen experiments. The interpretation of these results and the determination of the sensitizing substance are not so simple. The speaker thinks there is justification for the belief that the nature, the frequency and the intensity of the hypersensitiveness in patients with chronic nephritis associated with renal insufficiency may be due to causes different from those that are operative in cases of essential arterial hypertension.

Professor Zagami discussed the effects of the combined action of morphine and insulin. From experiments, he found that morphine in doses of from 0.02 to 0.06 Gm. per kilogram of body weight (rabbits and rats) hastens the convulsions in which the hypoglycemic syndrome of insulin commonly culminates. Through the simultaneous action of morphine and insulin, the lowering of the glycemic index in rabbits resulted more promptly and in a more marked manner than through the action of insulin alone. The observation was not, however, made in pigeons. An important condition for bringing about convulsions appears to be not only the degree of the lowering of the glycemic index in itself but also the degree of permanence of these states.

Professor Valdoni presented some observations on simple hypertrophy of the prostate. Having performed a histologic examination of forty prostates removed surgically with a diagnosis of simple hypertrophy, he found an epithelioma in 15 per cent of the cases. In the remaining cases the hypertrophy, instead of being represented by an increase in volume of the whole organism, was frequently nodular and presented the characteristics of adenomas and fibromas. These observations may be regarded as absolute indications for early intervention.

Professors Meldolesi and De Orchi reported on their study of eighty cardiopathic patients of various types, in a state of decompensation. They found that the polycythemia resulting from decompensation is nearly always a phenomenon limited in extent, and that it is not found in the arteries. The increase in the number of red corpuscles is only apparent. Hence, so-called decompensation polycythemia is in reality a venous polycythemia the extent of which changes in the various periods of decompensation.

Professor Valdoni reported the results of his research on menstrual activity in disorders of the stomach. He found that such activity is increased in duodenal ulcers and absent in cases of stenosis and of high acidity. After a gastro-enterostomy, menstrual activity diminishes in intensity, whereas it disappears almost entirely after gastric resections.

Prof. G. Meldolesi studied the basal metabolism in patients with exophthalmic goiter during menstruation. In sixteen patients with metabolism notably increased he found an increase immediately preceding the menses, a decline of metabolism during the menstrual flow, and a slight return to stabilized values during the first days of the postmenstrual period. Such changes do not run parallel with variations in the circulation or with the degree of sensitiveness to epinephrine but are affected by correlations between the ovarian functioning and the thyroid functioning.

Changes in the Lungs During Physical Effort

Professor Arnone of the University of Palermo spoke, at a session of the Società di studi scientifici sulla tuberculosi, on the radiologic changes that occur in the lungs of athletes before, during and after physical effort. An examination of numerous roentgenograms showed that, during the effort, there appear, or become notably intensified, certain hilar and pulmonary shadows which are due to a vascular network more distended than usual.

In the discussion, Professor Fici pointed out that observations on the lungs of athletes during a period of heavy breathing reveal an increased transparency, especially in the upper areas. This may be proof of what some authors advance in explanation, in certain cases, of the frequency with which, in the adult, the specific pulmonary lesions have their primary seat in the apical and infraclavicular regions. This fact would appear to be due to the varying intensity of the expiratory current between the lower and the higher areas of the lung, with predominance of the basal or ascending current, as compared with the apical

or descending current. There would be, in that case, a stagnation of air in the upper areas of the lungs and hence an arrest of the dust that serves as a vehicle of the tuberculous virus.

Professor Giuffrè considered that, in order to weigh properly the results reported by Professor Arnone, it would be necessary to compare them with observations made on persons who do not participate in gymnastic exercises.

Professor Epifanio, speaking of the meaning of the term "effort lung," considers that the radiologic observations made are referable to changes in the pulmonary circulation, which depend on the condition of the heart due to effort.

Professor Cirimmina remarked that the communication of Professor Arnone corrects an erroneous conception in regard to the pulmonary circulation during exertion and proves that, under such circumstances, the afflux of blood to the respiratory center is greater, contrary to the general belief.

Professor La Franca stated that a disturbance of the pulmonary circulation finds its expression in a distention of the vessels of the pulmonary network. The facility with which such distention occurs and the duration of the intensity are influenced by the constitutional tendency of the individual and the respiratory capacity of the cardiovascular system.

Dr. Piraino asked Professor Arnone whether he had noted the presence of distention affecting the trunk and the main branches of the pulmonary artery.

Professor Arnone replied to the various questions. The roentgenograms that he presented revealed like conditions in the two lungs. The term "effort lung" should be maintained, not only after the analogy of the term "effort heart," but also because it serves to designate a well defined clinical picture. He had observed roentgenologically a dilatation of the vascular fascia during the effort and affecting to a great extent the pulmonary artery.

Medicolegal Aspects of the Habitual Delinquent

Professor Ottolenghi of the University of Rome recently delivered a lecture, which formed part of a course in legal medicine, given in Rome. He discussed the medicolegal aspects of the habitual delinquent or, better, the *delinquente per tendenza,* as he is termed in the new penal code of Italy. The speaker pointed out the close relationship between the term "congenital attitude," as explained in his classification, and the term "tendency," as formulated by the legislators. Many controversies have developed with regard to the *delinquente per tendenza,* who is recognized as belonging to the category of abnormal persons, and especially with reference to his responsibility or accountability. The speaker held that his responsibility should be fully recognized, and regretted that in the new code the infliction of penalty in such cases has been abolished. He considers it also a mistake to restrict the term "tendency" to crimes against the person. Owing to this restriction, Professor Ottolenghi pointed out that a large portion of such delinquents will fail to receive the measure of protection intended, since the greater part of them commit crimes involving property.

The new penal code has given rise to renewed research not only in the field of anthropology, in which the types of the congenital delinquent and of the criminaloid are being subjected to revision, but also in the field of criminal justice, in which the problem of the limits and the degrees of responsibility is being restudied. In connection with these studies, medicolegal training for the judges should be emphasized. A first step in this direction is the creation of the "bibliographic file," which is now being regularly compiled, on the basis of modern scientific criteria, under the supervision of the judicial authorities.

Congress on Demographic Studies

The section on medicine and hygiene of the Congresso internazionale per gli studi sulla popolazione met recently in Rome, under the chairmanship of Professors Pestalozza, Gabbi and Mecfler. Professor Hersch of the University of Geneva presented a paper on poverty in relation to mortality from the principal causes of death, as derived from the statistics of the city of Paris. He said that poverty is not a simple notion but represents a complex of notions that are interconnected: poor and scanty food, unhygienic dwellings, overwork and the like. In order to procure reliable figures, it is necessary to consider statistics on the causes of death—and, in any event, the figures must be interpreted in a relative sense.

Professor Gabbi, senator and clinician of the University of Parma, discussed the acclimatization of Europeans to a tropical climate. He reported the results of research on the composition of the air and paused to speak of the aerosomes, recently discovered, which appear to possess some importance in explaining the phenomena of acclimatization with respect to certain organic functions of the European in the tropics. He discussed also mental acclimatization.

Professor Blemer of Marseilles presented data with regard to the birth rate among Frenchmen in Indo-China.

Professor Ilvento, with the collaboration of Professor Labranca, discussed the epidemics of recent years, pointing out the factors on which the present theory of epidemiology is based.

Professor Galvani spoke on the decline of mortality in various countries, giving for thirteen peoples the course of general mortality, and also the mortality for each sex and age group. Senator Gabbi gave the infant and child mortality in the African colonies, according to the results of an inquiry instituted by the Unione internazionale del soccorso al fanciullo, which has its headquarters in Geneva. He suggested that the Opera nazionale italiana per la maternità e infanzia should deal also with the child welfare problem in the Italian colonies.

Dr. Somoggi discussed the mortality from puerperal disease, pointing out that it presents marked differences in the various age groups. The lower values are found, as a rule, in women aged 20 to 30, and the higher values in the older age groups. These differences are due in part to organic reasons but in part also to social and hygienic causes.

Professor Lasorsa dealt with the seasonal variations in the mortality with reference to the causes of death. He reported the results of his studies which, in addition to data to be collected for the kingdom of Italy, refer to regions that present typical differences in climate, such as Lombardy and Apulia. For the city of Venice, the speaker has completed a special study on the correlations between the mortality curves according to the various groups and the curves of the principal climatic factors.

BUCHAREST

(From Our Regular Correspondent)

Nov. 20, 1931.

Prevention of Puerperal Infection

At the congress of French speaking obstetricians and gynecologists, in Bordeaux, France, October 1-5, Dr. N. Gheorgiu, professor of obstetrics and gynecology at the University of Bucharest, gave an address on the prophylaxis of puerperal infections and late childbed hemorrhages. It is well known, he said, that late hemorrhages can be traced to two well defined causes: (1) the incomplete expulsion of the placenta and membranes, the placenta fragments that remain, however small, being capable of provoking instantaneous or late hemorrhages, and of being the agents of puerperal infection; (2) puerperal infection. To avoid these emergencies, Professor Gheorgiu's practice is to control the uterine cavity immediately after confinement. This procedure was objected to by the German and the French obstetric schools. The German "Hände weg" slogan was regarded over a long period as an unshakeable principle. It seems now that a turn has set in, for at this congress some lecturers felt inclined to accept the principle in its entirety and

some in certain details so that in cases in which there is the least doubt as to the completeness of the placenta it is admissible as a prophylactic measure to control the uterine cavity immediately after labor, even in cases in which only the membranes have been incompletely expelled. Professor Gheorgiu's principle has been the subject of intense disputes and has been declared worthy of adoption by Haugh of Copenhagen, Voron of Lyons, Keller of Strasbourg, Renther of Lyons and Ecalle of Paris.

Medical Advertisements in Lay Journals

To all those whose names were notorious in advertisements appearing in lay journals the medical chamber, which was constituted in June, sent a circular order to stop advertising within fifteen days or appear before the disciplinary committee. Although five months has passed since the orders were sent out, many advertisements still appear in the papers, just as though the advertisers had not been notified as to the offense they are committing against medical ethics. Here are samples, both appearing in the daily paper *Dimineata*, which has the largest circulation in Bucharest:

Dr. Eraclie Sterian, late internist of the Bucharest Civilian Foundation Hospital, consulting physician of a hospital, corresponding member of the Berlin Urological Society, specialist in genito-urinary diseases and internal diseases, with his own polymicrobial serum treats all the complications caused by the gonococcus, colibacillus and staphylococcus, arthritis, rheumatism, ophthalmia, prostatitis, orchitis, ovaritis, metritis and chronic blennorrhagia. Cure is guaranteed in 92 per cent of the cases, without the use of diathermy or operation. See: Congres Français d'Urologie, C. Doin, 1922, Paris. Moderate prices.

Another example: Impotence, timidity (shyness), neurasthenia, hysteria, melancholia, neurosis of the heart and stomach (palpitation, hiccough). Neuralgia's, paralysis, trembling, insomnia, drowsiness, migraine are surely cured by hypnotism, autosuggestion, physical therapy and the application of ultra-high frequency currents. Hypnopedagogic treatment according to Bertillon's method, for the education of criminal children. Onania, bed wetting, etc. Dr. H. Martin, collaborator to the Psychophysical Institute, Bertillon, Paris.

It shows the weakness of the management of the newly organized medical chamber that these advertisements appear from day to day, before the eyes of the directors of the chamber. Had the medical journal *Praxis Medici* not called the attention of the leading council of the chamber to this offense against medical decency, the expensive but seemingly profitable advertisements would have been continued ad infinitum.

The Reduction of Medical Fees

There is a critical economic condition prevailing all over Rumania. This is so keenly felt by the medical profession that many physicians, particularly in towns and cities, have applied to the city medical officers for the cancellation of their names on the medical register, since they are unable to pay their rents and taxes. In some towns the fees for medical visits have already been reduced to a minimum, so that the fee for a consultation is not much more, indeed, than a barber's charges for cutting hair, and yet patients do not visit the waiting rooms of physicians. The chief cause is the poverty of the public. Owing to general unemployment, people cannot afford to pay even the reduced fees. Patients are deterred from consulting physicians, not only by the fees to be paid to physicians but by the high prices of medicines. As it is a fashion to prescribe proprietary medicines, which are almost without exception imported from abroad, the high prices paid for these drugs are actually handicapping medical practice. In a large Transylvanian town, a manufacturing center where, owing to the stoppage of work, more than 30 per cent of the population is unemployed, some physicians of great repute continued to charge their customary fees, in the belief that those who want their help will pay their fee. The opinion became current throughout the city that, in view of the exorbitant fees, it was a luxury to call a doctor. Of course this affected only the less favored physicians, who assembled at a meeting and resolved to send a memorandum to the medical association and to demand the compulsory reduction of medical fees. They fixed the maximum that can be charged for simple medical visits and for consultations in the physician's office. They argued that the great mass of physicians are justified in expecting cooperation from the leading doctors. Some years ago, when there was a boom in medical practice, the physicians with small practices stood solidly with those whose services were more generally demanded, as they accepted the proposal that a minimum fee for visits and consultations be fixed and they loyally observed these minimum prices. Now that the physicians who charge large fees have succeeded in alienating the public from calling a physician, it is their duty to reduce their prices and observe the maximum fee rule, for the sake of the many physicians who have to struggle for their livelihood.

Legalizing Abortion in Poland

The new Polish penal code, which will be presented by the government to the Sejm national assembly shortly, contains a novelty. The draft of the new health law cancels the paragraph relating to punishment for induced abortion. The law allows gynecologists and also general practitioners who have the necessary dexterity to perform the operation successfully to perform an abortion at the request of patients, if health or social conditions render it justified. In the future, only midwives and quacks will be prosecuted by law for inducing abortion. The Catholic clergy and press are much embarrassed at the report and have started a great campaign against the adoption of this scheme.

RIO DE JANEIRO

(From Our Regular Correspondent)

Nov. 15, 1931.

Endoscopic Phrenicectomy

Dr. F. de Souza Mendes recently delivered a lecture before the Sociedade de Medicina e Cirurgia de Rio de Janeiro on his technic for performing phrenicectomy under direct endoscopy of the operative field. The aim of direct endoscopy in this procedure is to minimize, as much as possible, the operative trauma. The speaker performed phrenicectomy under direct endoscopy of the operative field in fifteen patients, with the following technic: At a point 3 cm. above the clavicle, behind the posterior head of the sternocleidomastoid muscle, a 1 cm. horizontal incision is made, through the skin down to the superficial cervical aponeurosis. In this opening an aural dilator of the Hartmann type and of the proper length is introduced to form a passage through which the light of a head mirror is directed, so that it illuminates entirely the scalenus anterior muscle and the phrenic nerve, which should be resected at that point. Once the phrenic nerve is sectioned, the author introduces through the same route a metallic apparatus of his own invention which carries in a pair of Kocher's forceps. The phrenic nerve is picked up with the forceps, and with a twisting motion of the instrument the nerve is curled about it. By this technic one is able to remove as much as 41 cm. of the phrenic nerve. After the phrenic exeresis is accomplished, the small incision is closed with a horsehair suture. The speaker presented before the society, for purposes of comparison, two groups of patients who had been subjected to phrenicectomy. In one group, phrenicectomy had been done according to the speaker's method, while in patients of another group the operation had been performed by the ordinary surgical technic.

Malarial Granuloma

Dr. Saul Carneiro reported recently before the Sociedade de Medicina e Cirurgia of Rio de Janeiro observations made at necropsy on a person who had died of tropical malaria. The disease had caused many lesions of the brain tissues, in which malarial granuloma had developed. The speaker stated that Durck, who first described malarial granuloma, gave as characteristic for the condition the presence of many nodules which on microscopic examination appear to be either hemorrhagic foci or small yellow-brown spots in the white cerebral substance under the lowest cortical layers. With Weigert's method of staining (for myelin) they appear as lightly tinged points, indicative of the local interruption of myelin fibers. As a rule the axis cylinders of the nerves are not affected. The speaker made a thorough microscopic study of sections from the brain tissue with Nissl's staining method and Hortega's method of silver impregnation, and found that the malarial nodules were composed solely of nerve cells of a type which Nissl called stäbchen-zellen and which are microglia cells (Hortega cells) or "dritte element" of the nervous system.

Indicanemia

Dr. Hélion Póvoa recently read a paper before the Academia Nacional de Medicina of Rio de Janeiro on the clinical value of indicanemia as an indication of the presence of uremic or renal conditions. He pointed out that the presence of azotemia does not in every instance constitute a reliable indication of the renal or uremic disorder, since it may be caused by starvation, hyperfunctioning of the liver, lack of salt, postoperative hemolysis or infectious diseases. The speaker, in collaboration with Dr. A. de Vasconcellos, attended a Brazilian patient with renal sclerosis in whom the determinations of the indican gave reliable results in regard to the patient's condition. The indican content of the blood in this case was high (21.38 mg. of indican per liter of the blood). The indican content of the blood did not change in the several determinations performed, even during the periods of marked improvement of the patient, during which under proper treatment she was able to resume her domestic duties with complete relief from her worst symptoms. The patient died some months later. The speaker supports the opinions of Coutinho and Pedrosa, who believe that determinations of the indican content of the whole blood give more reliable results than determinations made with the blood serum.

Evolution of the Tubercle Bacillus

Dr. Motta Rezende recently published a paper on the evolution of the tubercle bacillus. The evolution of Mycobacterium tuberculosis is not as yet thoroughly understood. The bacillus presents the following three phases of evolution: "Fontes ultravirus," "Ravetllat-Plá micrococcus" and "Koch bacillus." The ultravirus, which represents the initial phase of biologic evolution of the virus, is a filtrable form, invisible with a microscope although demonstrable by the inoculation test. The micrococcus represents the vegetative phase; it appears in the form of isolated coccus, diplococcus, diplostreptococcus, tetrads or zooglea. The tubercle bacillus represents the resistance phase in which the organism appears already formed and more or less granulous. Both ultravirus and micrococcus are "virulent" forms, while the tubercle bacillus is the form that has developed enough resistance to retain the morbigenous potentiality of the virus. The tubercle bacillus, when dissociated, originates several other forms of virulent organisms, and when the dissociation takes place in vivo the newly generated bacteria are hypervirulent. Inoculation with the ultravirus causes more or less grave septicemia; that with the micrococcus originates inflammatory lesions, and that with the tubercle bacillus generally causes fatal lesions while originating hypervirulent forms of bacteria.

Marriages

THOMAS M. ROBERTS, Sweetwater, Tenn., to Mrs. Anna Belle Owens of Americus, Ga., in Knoxville, Oct. 18, 1931.

JOSEPH COYLE, Bremerton, Wash., to Miss Marguerite Hazel Fuller of Dunbridge, Ohio, in October, 1931.

ALBERT W. COLLINS, Anderson, Ind., to Mrs. Janet MacKenzie Dovey of Ottawa, Ill., Nov. 14, 1931.

DUDLEY H. MORRIS to Miss Margaret Donaldson, both of New York, in Greenwich, Conn., Oct. 17, 1931.

ARTHUR L. OSBORN, Waldo, Ohio, to Miss Dorothy Davis of Baltimore, in Kansas City, Oct. 17, 1931.

GEORGE A. MAY, Madison, Ind., to Miss Mildred Ann Scheirich of Louisville, Ky., Oct. 19, 1931.

BEAN MARK PALMER, Youngstown, Ohio, to Miss Laurine Mattern of Berkeley, Calif., Nov. 18, 1931.

FREDERICK J. DINEEN, Painesville, Ohio, to Miss Helen Reyle of Cleveland, Oct. 24, 1931.

NICHOLAS DYKSTRA, JR., Chicago, to Miss Ilma Takola of Hibbing, Minn., Oct. 20, 1931.

ARNOLD KLEIN, St. Louis, to Miss Ruth Birnbaum of Detroit, Oct. 21, 1931.

LLOYD R. SHAW, Statesville, N. C., to Miss Enola Gertrude Watts, Oct. 17, 1931.

Deaths

Verner Trenary Scott ✠ Major, M. C., U. S. Army, Washington, D. C.; Medical Department of the University of Cincinnati, 1913; served during the World War; entered the medical corps of the U. S. Army as a first lieutenant in 1917 and in 1929 was made a major; aged 43; died, Dec. 15, 1931, in the Walter Reed General Hospital, of chondrosarcoma of the left ischial tuberosity with general metastases.

William Harop Hattie, Halifax, N. S., Canada; McGill University Faculty of Medicine, Montreal, Que., 1891; member of the American Psychiatric Association; assistant dean and professor of hygiene, public health and mental diseases, Dalhousie University Faculty of Medicine; secretary and registrar of the Provincial Medical Board of Nova Scotia; aged 61; died, Dec. 4, 1931.

Raleigh Peter Hale, East Chicago, Ind.; Northwestern University Medical School, Chicago, 1908; member of the Indiana State Medical Association and the American College of Physicians; past president of the Lake County Medical Society; formerly mayor of East Chicago; on the staff of St. Catherine's Hospital; aged 48; died, Dec. 1, 1931, of heart disease.

William Ellis Fawcett ✠ Bushnell, Ill.; Western Pennsylvania Medical College, Pittsburgh, 1898; member of the Michigan State Medical Society; medical director and superintendent of the Elmgrove Sanitarium; formerly superintendent of the Pureair (Wis.) Sanatorium; aged 55; died, Dec. 12, 1931.

Edward Randolph Michaux, Greensboro, N. C.; Medical Department of the University of the City of New York, 1889; member of the Medical Society of the State of North Carolina; on the staff of the Clinical Hospital; aged 72; died, Dec. 2, 1931, of hypernephroma of the left kidney.

Archibald Angus Kerr, Salt Lake City; Rush Medical College, Chicago, 1896; member of the Utah State Medical Association, the Western Surgical Association and the American College of Surgeons; attending surgeon to the Holy Cross Hospital; aged 62; died, Dec. 5, 1931.

David J. Evans, Zanesville, Ohio; Starling Medical College, Columbus, 1897; member of the Ohio State Medical Association; health officer of Zanesville; formerly county coroner and mayor; aged 56; died, Dec. 11, 1931, in the Good Samaritan Hospital, of heart disease.

Reid White ✠ Lexington, Va.; University of Pennsylvania School of Medicine, Philadelphia, 1892; attending physician to the Washington and Lee University; surgeon to the Virginia Military Institute; aged 63; died, Nov. 29, 1931, of chronic myocarditis and coronary occlusion.

John Gilbert Selby, Cumberland, Md.; University of Maryland School of Medicine, Baltimore, 1899; member of the Medical and Chirurgical Faculty of Maryland; aged 59; died, Nov. 28, 1931, in the University Hospital, Baltimore, of pneumonia, following an operation.

Edward Thomas Hargrave ⊕ Norfolk, Va.; Medical College of Virginia, Richmond, 1900; member of the American College of Surgeons; gynecologist to the Protestant Hospital and consulting gynecologist to the Florence Crittenton Home; aged 60; died, Dec. 1, 1931.

Swepson J. Brooks, Harrison, N. Y.: University of Virginia Department of Medicine, Charlottesville, 1889; served during the World War; proprietor of a sanatorium bearing his name; aged 62; died, Nov. 25, 1931, of gastro-enteritis and cardiac insufficiency.

Dru McMickin, Beaumont, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1891; member of the State Medical Association of Texas; health officer of Beaumont; aged 61; died suddenly, Nov. 26, 1931, of coronary occlusion.

Frank W. Harmon, San Diego, Calif.; Medical College of Ohio, Cincinnati, 1881; formerly superintendent of the Longview Hospital, Cincinnati; aged 80; died, Dec. 5, 1931, of arteriosclerosis, chronic fibrous myocarditis, nephritis and purulent cystitis.

Henry Colt ⊕ Pittsfield, Mass.; Harvard University Medical School, Boston, 1881; past president of the Berkshire District County Medical Society; on the staff of the House of Mercy Hospital; aged 75; died, Dec. 8, 1931, of heart disease.

Frank Jay Blackmer ⊕ Steamboat Springs, Colo.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; aged 50; died, Dec. 2, 1931, in the Steamboat Springs Hospital, of perforated duodenal ulcer.

Fred Harrison Brines, Albion, Ill.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1911; past president of the Hamilton County Medical Society; aged 51; died, Dec. 9, 1931, of pulmonary tuberculosis.

Oliver Newall Duvall, Baltimore; Southern Homeopathic Medical College, Baltimore, 1901; formerly secretary of the homeopathic board of the Maryland State Board of Medical Examiners; aged 63; died, Dec. 12, 1931, of acute myocarditis.

Clifford C. Curnalia, Roscommon, Mich.; American Eclectic Medical College, Cincinnati, 1895; member of the Michigan State Medical Society; aged 60; died, Dec. 10, 1931, of an accidental gunshot wound received while cleaning his rifle.

Corydon Ford Heard ⊕ Erie, Pa.; University of Michigan Medical School, Ann Arbor, 1898; member of the American Academy of Ophthalmology and Oto-Laryngology; aged 55; died suddenly, Dec. 17, 1931, of cerebral hemorrhage.

James J. Booker, Greensburg, Ky.; University of Louisville School of Medicine, 1886; member of the Kentucky State Medical Association; aged 81; died, Nov. 28, 1931, of coronary sclerosis and chronic interstitial nephritis.

Frederick Morris Gibson, Minneapolis; University of Michigan Homeopathic Medical School, Ann Arbor, 1884; aged 74; died, Nov. 19, 1931, of carcinoma of the stomach, myocarditis and mitral insufficiency.

Charles F. Zimmerman, Naper, Neb.; Chattanooga (Tenn.) Medical College, 1898; also a pharmacist; member of the Nebraska State Medical Association; aged 65; died, Nov. 15, 1931, of heart disease.

William H. E. Wehner, Philadelphia; Jefferson Medical College of Philadelphia, 1887; medical director of the Fidelity Mutual Life Insurance Company; aged 66; died, Dec. 5, 1931, of cerebral embolism.

William Davis Northcutt ⊕ Longview, Texas; University of Louisville (Ky.) School of Medicine, 1890; formerly mayor and county and city physician; aged 70; died, Nov. 20, 1931, of chronic myocarditis.

Daniel W. Reddin, North Baltimore, Ohio; University of Michigan Medical School, Ann Arbor, 1881; formerly member of the school board; aged 71; died, Dec. 11, 1931, of pneumonia and heart disease.

Emily Frances Hunt ⊕ Keuka Park, N. Y.; Syracuse University College of Medicine, 1925; physician to the Keuka College; aged 48; died, Nov. 11, 1931, in the Baker Memorial Hospital, Boston.

Charles George Kirchhof, New York; Bellevue Hospital Medical College, New York, 1884; aged 60; died, Oct. 20, 1931, in the Lebanon Hospital, of hypertrophy of the prostate and heart disease.

Ira E. Dunlavy, Indianapolis; Medical College of Indiana, Indianapolis, 1883; formerly deputy coroner and police surgeon; aged 70; died, Dec. 8, 1931, of paralysis agitans and carcinoma of the liver.

Joseph Alexander Rainville, Philadelphia; Medico- Chirurgical College of Philadelphia, 1906; for fifteen years police surgeon; aged 54; died, Dec. 4, 1931, of subacute bacterial endocarditis.

Harvey W. Strader, Sacramento, Calif.; College of Physicians and Surgeons, Baltimore, 1885; member of the California Medical Association; aged 71; died, Nov. 12, 1931, of chronic nephritis.

Charles A. Fraser, Wellsville, Ohio; Cleveland Homeopathic Medical College, 1900; member of the Ohio State Medical Association; aged 56; died, Dec. 7, 1931, of heart disease.

Millard Filmore Patterson, Grandfield, Okla.; Vanderbilt University School of Medicine, Nashville, Tenn., 1893; died, Dec. 9, 1931, in the Waurika (Okla.) Hospital, of encephalitis.

A. Clifton Norman, Braxton, Miss.; Memphis (Tenn). Hospital Medical College, 1901; aged 54; died, in November, 1931, of heart disease, hypertension and cirrhosis of the liver.

Samuel D. Parsons, Woodruff, S. C.; University of Maryland School of Medicine, Baltimore, 1880; for many years bank president; aged 75; died, Dec. 1, 1931, of mitral regurgitation.

Aquilla H. Durrum, Myers, Ky.; Miami Medical College, Cincinnati, 1890; aged 73; died, Dec. 1, 1931, in the Johnson Memorial Hospital, Carlisle, of chronic colitis.

Jose de Sousa Bettencourt, San Francisco; Medical College of the Pacific, San Francisco, 1877; aged 81; died, Dec. 4, 1931, of bronchopneumonia and heart disease.

Lewis Bramwell Collier, Alhambra, Calif.; Rush Medical College, Chicago, 1889; served during the World War; aged 71; died, Nov. 30, 1931, of coronary thrombosis.

Peter Barkey ⊕ Erie, Pa.; Philadelphia University of Medicine and Surgery, 1871; formerly city health officer; aged 83; died, Dec. 5, 1931, of myocarditis.

Celdo Benno Semerak ⊕ Chicago; Rush Medical College, Chicago, 1916; instructor of pathology at his alma mater; aged 56; died, Dec. 15, 1931, of pneumonia.

George A. Krebs ⊕ St. Louis; St. Louis College of Physicians and Surgeons, 1888; aged 63; died, Dec. 5, 1931, in the Alexian Brothers' Hospital, of pneumonia.

James Nottingham Carter ⊕ Savannah, Ga.; Vanderbilt University School of Medicine, Nashville, Tenn., 1901; aged 53; died, Dec. 6, 1931, of heart disease.

William Ira Wright, Collinsville, Ala.; Vanderbilt University School of Medicine, Nashville, Tenn., 1890; aged 68; died, Dec. 2, 1931, of angina pectoris.

Nathan Alpert ⊕ Baltimore; Moscow State University Faculty of Medicine, Moscow, Russia, 1906; aged 49; died, Dec. 14, 1931, of heart disease.

William H. Johnson, Charleston, S. C.; Howard University School of Medicine, Washington, D. C., 1887; aged 66; died, Dec. 4, 1931, of uremia.

Henry Cummings Adderly, Chester, Ill.; St. Louis Medical College, 1875; formerly mayor of Chester; aged 77; died, Dec. 8, 1931, of heart disease.

William Wesley Clapp, Birmingham, Ala.; Western Homeopathic College, Cleveland, 1868; aged 85; died, Dec. 13, 1931, of lobar pneumonia.

James T. Crawley, Kosciusko, Miss. (licensed, Mississippi, 1880); aged 77; died, Nov. 26, 1931, of bronchopneumonia and carcinoma of the colon.

Charles B. Johnston, Harrell, Ark.; Memphis (Tenn.) Hospital Medical College, 1901; aged 60; died, Nov. 17, 1931, of Parkinson's disease.

James E. Cowan, Galesburg, Ill.; Rush Medical College, Chicago, 1874; aged 82; died, Nov. 10, 1931, in the Galesburg Cottage Hospital.

Samuel D. Warnock, Atlanta, Ga.; Atlanta Medical College, 1893; aged 63; died, Nov. 30, 1931, of hemiplegia and arteriosclerosis.

Harold B. Anderson, Beloit, Wis.; College of Physicians and Surgeons, Chicago, 1884; aged 66; died, Nov. 26, 1931, in Janesville.

Harry Harrison, New York; Long Island College Hospital, Brooklyn, 1915; aged 41; died, Sept. 25, 1931, of cerebral embolus.

Jesse Boone Regester, Spring City, Tenn.; Chattanooga Medical College, 1906; aged 59; died, Nov. 13, 1931, of tuberculosis.

Charles C. Cummings ⊕ Joplin, Mo.; Rush Medical College, Chicago, 1897; aged 65; died, Nov. 28, 1931, of heart disease.

Correspondence

ULCERATIVE COLITIS—ENDAMOEBA HISTOLYTICA

To the Editor:—In Queries and Minor Notes (THE JOURNAL, Dec. 19, 1931, p. 1913) is a query and reply under the heading "Ulcerative Colitis—Endamoeba Histolytica." I wish to draw attention to two things in connection with this query. In the first place, the query itself shows that adequate diagnosis of amebiasis had not been made. Without iron-hematoxylin stains, identification of the ameba is most uncertain. In the second place the answer contains many points which are not well authenticated. Taking these in order, eosinophilia is not characteristic of amebiasis and, when present, can usually be ascribed to some other factor. In fact, the blood count is absolutely useless in the diagnosis of amebiasis. It is certainly not true that if colon lesions are due to Endamoeba histolytica a proctoscopic study should reveal typical ulcers. It is not uncommon to find the lower bowel free of amebic lesions when the sigmoid and cecum are heavily infected. It is certainly questionable whether the best treatment is that advocated by Rivas. There is no indication that mercurochrome has any antiamebic action. The use of opium is contrary to the best practice and is entirely unnecessary. Bismuth in any form prevents proper stool examination and should be kept for final recourse and not given at first.

The dosage mentioned for emetine is entirely too high, and the total dosage and duration of its administration are not mentioned. There is little or no evidence that neoarsphenamine is of any use whatever, given alone. The use of ipecac powder is decidedly archaic and even in the old days could have been given in a much better fashion than advocated here. The dosage advocated for acetarsone will give a percentage of poisoning. The presence of Endamoeba histolytica in the gallbladder is certainly not well enough established to justify recommendation of cholecystectomy. The remarks on the migration of the protozoa to bone marrow, etc., are not borne out by adequate authority, in fact are not recognized by most authorities. Without question the statement is dangerous that such migrations might call for a long continued use of emetine or neoarsphenamine. Finally, amebiasis does not cause decreased hydrochloric acid, nor is there evidence sufficiently valid of any specific effect on pancreatic secretion or anemia.

ALFRED C. REED, M.D., San Francisco.
Professor of Tropical Medicine,
University of California.

EDUCATION IN COMBATING CANCER AND THE USE OF CANCER HOSPITALS

To the Editor:—The interesting and significant comment of the regular correspondent of the American Medical Association, submitted from Berlin under date of Sept. 7, 1931, and appearing in the October 24 issue of THE JOURNAL, brings out some important differences between the situation there as regards the cancer problem and that existing in this country.

The first item of importance is the fact that the German "cancer control" groups are pledged primarily to "promote research on a cure for cancer." In this respect they somewhat resemble the British organizations, which spend a considerable portion of their income on the subsidy of research. In our country the objectives of the American Society for the Control of Cancer, as stated in its articles of incorporation, are as follows: "To collect, collate and disseminate information concerning the symptoms, diagnosis, treatment and prevention of cancer; to investigate the conditions under which cancer is found and to compile statistics in regard thereto." It will be seen, therefore, that our problem is primarily one of education of the profession and the laity and that it does not include the subsidy of fundamental research facilities as such. In this respect the United States appears to be following a general trend which can be recognized in almost every European nation. Belgium, Denmark, France, Holland and Poland all have under way well developed programs of public and professional education on the symptomatology, diagnosis and treatment of cancer.

It is interesting to note that the German organization mixes with its prime interest in research projects a certain amount of educational propaganda and that the correspondent notes a resulting dissatisfaction with some of the policies followed. In this country we have had in the past to face exactly the same situation.

One is always certain to encounter differences of opinion as to the value of education in combating cancer. In the United States, however, the American Society for the Control of Cancer, which has studied this question longer and more intensively than has any other group, is convinced of the very considerable value of educational procedures.

An early overoptimism which led to sweeping generalizations concerning the curability of cancer in its early stages has gradually given place to a more conservative statement that the chances of cure are greatly increased by earlier correct diagnosis of the disease, followed by immediate treatment with surgery or irradiation. With this qualification one avoids the dangers of overstatement quite properly pointed out by the Berlin correspondent. The existence of many types of cancer in which early diagnosis is difficult if not impossible and in which the percentage of cures is far from 100 per cent must, of course, be recognized. This fact, however, does not in the least weaken the value of the statement already given. The fact remains that the best chance of cure today follows early diagnosis and immediate treatment. Fewer false hopes are aroused by an educational campaign conducted in a conservative manner than accrue when merely emotion and the uncontrolled hopes of patients are allowed to determine their reactions.

Perhaps the earliest recognition of the value of education in the campaign against cancer was recorded by Professor Winter of Königsberg. The necessarily but unfortunately slow and painful progress of any educational idea in this or any other field is thus shown by the present German attitude on the matter.

The question of cancerphobia is also one that must always be considered. It is clear, however, that if many people are taught to recognize the early symptoms of a suspicious nature and report for examination following their recognition of these symptoms, a great number will be properly informed that they are not cancerous. This will result in an enormous mental relief, which lies entirely within our power at present to give. To those who do have cancer the earliest possible recognition of that fact by properly trained medical men is a clear and undeniable advantage. On a recent trip to Europe it was interesting to note that in the Scandinavian countries cancerphobia had been largely overcome by intelligent frankness. Only in countries perhaps more emotional was the medical profession in doubt concerning the value of facing the facts. This does not of course mean that every patient should be informed of his condition. The medical profession is amply qualified to use its judgment in that respect. It does, however, mean that to neglect or to discontinue sane and conservative educational efforts would, in the opinion of those who have studied the situation here most clearly, be a grave error. The American Society for the Control of Cancer recognizes, as its articles of incorporation show, that constant investigation of the conditions under which cancer occurs, as well as of its distribution, is a necessary and wise complement to any educational work. Bearing in mind that such investigation is being and will continue to be carried

on, it would seem that many of the fears which are today worrying our associates in Germany need not affect our own problem.

The second point of major interest in the communication from Germany has to do with central cancer hospitals. It states: "The proposal to erect central cancer hospitals gives rise to grave doubts. The Faculty of Medicine can in no wise support the view that, through the erection of special cancer hospitals, or, to use a euphemistic term, special radiotherapeutic hospitals, the results in the treatment of cancer would be greatly improved."

In this statement there is included a broad hint that it is the overemphasis of radiology in such clinics rather than the establishment of the clinics per se that is the basis for objection. Further evidence that this is the case is provided in an article by Kuttner, Sauerbruch and Schmieden (*Med. Welt* **5**:981, 1931) in which the authors, representing current surgical opinion in Germany, maintain that in the plan for such clinics in that country radiology has been overemphasized and surgery overlooked. They feel that these clinics should be manned by individuals representing all the various specialties in the field of cancer diagnosis and therapy.

The need of comprehensive and balanced representation of the specialties in such clinics has been emphasized clearly in a valuable discussion of this problem by Ewing, Greenough and Gerster (THE JOURNAL, July 20, 1929, p. 165). These authors, after an intensive study of the question, strongly favor the establishment of central cancer clinics but give as a part of their recommendations a definite list of the specialties that should be adequately represented in such organizations.

What our German associates are really discussing, therefore, seems to be the inadequacy of unbalanced educational and clinical programs rather than the value of well balanced ones. Consequently, their objections should not be transferred to the broader question of the great value of conservative education and well rounded cancer clinics, which has been amply proved by the outstanding success of both in this country and in many other countries.

C. C. LITTLE, Sc.D., New York.
Managing Director, American Society
for the Control of Cancer.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted, on request.

LEAD POISONINGS IN WORKERS ON STORAGE BATTERIES

To the Editor:—I have a patient in my care who is working in the preparation of storage batteries, as a plate maker. In this process red lead and a secret formula made by the National Lead Company are used. He has been at this work for eighteen or twenty years and has been using this new preparation for only three months. During the previous times, he has had an attack of plumbism, and abdominal cramps have now developed, together with cramping in all extremities. If you can give any information that can aid, or diagnose the lead poisoning alone, I could account for the symptoms. I want to be sure that I am not overlooking any substances in this preparation that may have a part in this attack.

F. M. JANSEY, M.D., Chicago.

ANSWER.—In addition to lead oxides and sulphuric acid, commonly employed in pasting the grids in storage battery plate making, a number of substances are at times used as expanders, porosity agents, hardeners, fillers and accelerators. Among other adjuvants are lamp black, ground carbon, wood flour, grain flour, graphite, barium sulphate, glycerin, phenol, magnesium sulphate, zinc chloride, caustic alkalis and pyridine. As used, none of these substances constitute major dangers, and no substance known to be in use produces any abnormal state likely to be confused with lead poisoning.

No laboratory tests in themselves infallibly provide a diagnosis of lead poisoning. Lead has repeatedly been shown in the urine of normal persons without demonstrable exposure to lead. Blood changes occurring in lead poisoning may appear in other conditions.

Since the pasting of lead grids in plate work is regarded as a most hazardous occupation with respect to the causation of lead poisoning the following clinical observations may be accepted as evidence of this type of poisoning: abdominal cramps of the variety associated with lead poisoning, as well as cramps in groups of other muscles such as in the calves of the legs, together with blood changes, notably preformed punctate stippled cells, and more than normal numbers of basophilic containing cells after gentle hemolysis which leaves the cell membrane intact. The lead line found in most cases of lead poisoning may be present after lead absorption without disabling lead poisoning, and conversely lead poisoning of a disabling degree may be present without this lead line. Lead in the urine in amounts above those found in normal persons constitutes valuable diagnostic evidence. The procedure described by Kehoe, Edgar, Thamann and Sanders (THE JOURNAL, Dec. 18, 1926, p. 2081) is the best known method of urine examination for lead. Many other manifestations in the lead poisoning picture aid in the diagnosis of lead poisoning. The entire picture, rather than any one observation, constitutes the best basis for diagnosis.

GONOCOCCAL ARTHRITIS

To the Editor:—I am seeking information regarding treatment and care of a postinfectious arthritis. The patient is a white man, aged 37, married. His wife is living and well, and their one child, 4 years old, is in good health. Otherwise, the family history is irrelevant. The patient contracted gonorrhea ten or twelve years ago, was treated and said to be cured. About five years ago, he began to have pain in the joints, which has extended to practically all the joints, and at this time involves all the joints of the upper and lower extremities. He has used various treatments, without the desired results. The patient is now being treated with heat to the affected parts, together with passive massage, traction to the lower extremities once a day, prostatic massage once a week (repeated smears are negative) and, once every five days, subcutaneous bacterial vaccine 1 cc., containing 1,000 million gonococci, 400 million Bacillus coli, 300 million Bacillus diphtheriae, 200 million streptococci, 500 million Staphylococcus albus and 500 million Staphylococcus aureus. An attempt has been made to eliminate all foci of infection. What can be used to get more motion and lessen the pain on movements of the extremities? Please omit name.

M.D., Kansas.

ANSWER.—The importance of the gonococcal infection cannot be overemphasized. The joints are probably sensitized by the original infection, lighted up by the infection which occurred five years ago. This case comes in the class of infectious atrophic or rheumatoid arthritis. The application of heat and passive massage is excellent.

One is at a loss to understand the interpretation of the sentence, "traction to lower extremities once a day." Traction usually remains in force throughout the twenty-four hours of the day.

So far as the use of the subcutaneous bacterial vaccine is concerned, no statement is made concerning whether the patient has a relapse, a reaction or a response. There appears to be no rational basis for the use of the vaccine mixture named.

It is frequently impossible to determine whether all possible foci of infection have been eliminated. The regional lymph glands may harbor infection and are difficult to eliminate. Were cultures of the regional lymph glands made?

Concerning the measures to obtain more motion and to lessen pain, one would suggest radiant heat, gentle massage and gentle active and passive movements. Diathermy should be tried, repeated or discontinued, depending on the response it calls forth. Heliotherapy, diet and endocrines have not been mentioned in the literature. Vaccines of the Crowe or Burbank type have been used in some cases to advantage.

PARALDEHYDE

To the Editor:—Will you please inform me as to the physiologic action of paraldehyde when given intravenously, its elimination, and its dangers? I should also like to learn the same things about it when it is given by mouth.

WAYMAN J. THOMPSON, M.D., Oklahoma City.

ANSWER.—When paraldehyde is given intravenously in doses of 4 cc. of a 10 per cent solution, it induces sleep rapidly. A dose of from 50 to 150 cc. of this 10 per cent solution causes profound general anesthesia. The drug is eliminated slowly, chiefly by the lungs, imparting a bad taste to the mouth and the odor of fusel oil to the breath, which may persist for several days. In toxic doses, paraldehyde causes coma, depression of the respiration, and death by paralysis of the respiratory center, the heart being in a good condition until just before death. On administration by mouth, it produces a feeling of warmth in the

epigastrium, this feeling extending rapidly to the limbs, quickly succeeded by dizziness and confusion, and sleep which may occur within five minutes. It produces less depression of the circulation than most other hypnotics. Unless given freely diluted, it is liable to produce, in addition, gastric irritation, possibly resulting in nausea and vomiting, especially if the stomach is irritable.

TYRODE'S SOLUTION

To the Editor:—In connection with the article on the treatment of obesity with low caloric diets by Drs. Evans and Strang (THE JOURNAL, October 10, p. 1063) I should like to ask two questions: What is the formula for Tyrode's solution, and what amounts daily of this solution should be given patients under this regimen?

J. W. LAING, M.D., Britannia Beach, B. C.

ANSWER.—Tyrode's solution is a modification of the physiologic salt solutions of the Ringer type. It contains more varieties of ions than some of the other physiologic salt solutions which are in common use. The formula is:

NaCl	0.8
KCl	0.02
$CaCl_2$ (anhydrous)	0.02
$MgCl_2$	0.01
NaH_2PO_4	0.005
$NaHCO_3$	0.1
Dextrose	0.1
Water	to 100.0

In connection with a reduction diet, a salt solution is given primarily to insure an adequate supply of the various ions because of the diminution in the daily supply of vegetables. If all the necessary ions are given, it is felt that their relative balance and concentrations are of secondary importance when the mixture is given by mouth.

In practice, the use of the more concentrated commercial alkaline water preparations is found to be much more convenient. The carbonated forms are also more palatable. Obviously, the dosage is inexact. From three to four glasses of the more dilute solutions and two glasses of the more concentrated commercial preparations are commonly used daily.

HUMIDITY IN ARIZONA

To the Editor:—I note with interest the opinion expressed in THE JOURNAL, October 24, in an inquiry from a physician in Indiana, who regards the air at Phoenix as more moist than that at Tucson, presumably because of the greater irrigation. The weather bureau does not show this to be true. The tables of the United Sta' Weather Bureau show that the relative humidity at Phoenix is about t. same as that at Tucson and that the humidity fails to rise as greater areas are irrigated—there's just too much desert to make any difference.

M.D., Arizona.

ANSWER.—According to the figures of the United States Weather Bureau, as cited in the bulletin consulted, the average humidity of several of the cities of Arizona for the year 1929 was as follows:

From 6 to 8 a. m.		At 6 p. m.	
Phoenix	50	Phoenix	23
Prescott	58	Prescott	35
Tucson	53	Tucson	27
Yuma	55	Yuma	24

TREATMENT OF TRAUMATIC CATARACT

To the Editor:—A girl, aged 19, with a traumatic cataract, which was needled four weeks ago, now has a posterior synechia at 1 and at 5 o'clock, pupillary margin. There is a cortical substance in the lens which is visible in the outer fifth of the pupil area. The inner part of the pupil area is free from cortical lens substance. There is no pathologic change in the fundus. Vision in the right eye was 20/15 and in the left eye, corrected, 20/65. The point in question is, with this vision in the left eye would you advise a further needling and what are the chances of getting a prolapse of vitreous in the anterior chamber if I should go through the posterior lens capsule? Please do not publish my name.

M.D., Illinois.

ANSWER.—The patient should have the benefit of the best visual acuity that can be given without endangering the sight of either eye. Therefore it would seem advisable to perform a further needling, provided the cortical matter does not absorb after another six to eight weeks. During that time, the eye should be kept under the influence of atropine, and absorption should be stimulated by the use of heat and ethylmorphine hydrochloride. At the end of this time, if the capsular remains are within the pupillary area, if the posterior adhesions are still present, or if encapsulated cortical remains are still to be found, further needling should be performed. The danger of vitreous in the anterior chamber due to perforation of the posterior capsule is negligible.

TUBERCULIN

To the Editor:—1. Is a tuberculin solution identifiable either chemically or biologically? Please give reference. 2. Do animals, specifically cattle, become immune to tuberculin skin reactions after repeated injections?

RAWSON J. PICKARD, M.D., San Diego, Calif.

ANSWER.—1. A tuberculin solution cannot be identified chemically. The active principle of tuberculin is recognizable only by its specific effect on tuberculous animals. A solution may be considered as containing tuberculin if, with constancy and in several dilutions, it produces an inflammatory reaction in tuberculous animals, as in the skin of tuberculous guinea-pigs, and no change in normal animals.

Tuberculin: A Report of a Conference on Its Standardization, *Am. Rev. Tuberc.* **14:** 1 (July) 1926.

Philip, Robert; McKendrick, A. G.; Begbie, R. S.; Kermack, W. O., and Stewart, Donald: Standardization of Tuberculin, *J. Hyg.* **30:** 221 (June) 1930.

2. True immunity does not occur under these conditions. Animals, including cattle, can be desensitized by large subcutaneous injections so that temporarily the skin reaction is negative. But after a time (a few days or weeks), provided the tuberculous process in the animal remains active, the allergic state, as manifested by the skin test, returns.

TREATMENT OF BLACK, HAIRY TONGUE

To the Editor:—I have a patient who has a thick, furry coating on the tongue, which cannot be scraped or brushed off well. It becomes one-fourth inch thick at times; it is grayish at the tongue and brownish at the top. It ends abruptly near the base of the tongue about where the palate rests on the tongue. I believe that it is some fungous type of growth. Scraping and brushing the tongue, and gargles with various antiseptics do not remove it. I shall appreciate any suggestions that you may offer.

ARTHUR L. LANGHORST, M.D., Elgin, Ill.

ANSWER.—The treatment of black, hairy tongue varies according to the cause. It is thought by some workers to be a congenital abnormality which becomes apparent later in life. In many instances the condition has undoubtedly been caused by fungus infection. Vegetable dyes and chemical irritants from mouth washes are also thought to be the cause of some cases. Black, hairy tongue usually responds to ordinary antiseptic treatment with mouth washes containing potassium chlorate or boric acid. Painting the area with tincture of iodine helps in some cases, and, when the condition is resistant, some physical means such as electrodesiccation should be considered.

POSSIBLE RECURRENCE OF ADENOCARCINOMA OF CERVIX

To the Editor:—When a woman has had radium for an early adenocarcinoma of the cervix and has an apparent cure (two year interval), is there anything that should, or could, be done to make that apparent cure more secure? In case of recurrence, what should be done? From the best information that I can obtain here, radium in a recurrence is worse than useless. Please omit name and address.

M.D., Italy.

ANSWER.—If two years has elapsed without evidence of recurrence, the patient should be examined every two or three months, but no treatment is necessary. Had she reported at an earlier date, high voltage roentgen therapy, and perhaps also additional radium treatment, might have been advisable. In case of local recurrence, radium should unquestionably be used, but it should be employed with caution, because the danger of producing a fistula is considerable. The widespread belief that radium is worthless in case of local recurrence is far from true. Deep seated or more distant recurrences may often be controlled by high voltage roentgen therapy; a similar effect is obtainable with large amounts of carefully screened radium used at a distance.

SUDAN III AND LIQUID PETROLATUM

To the Editor:—Relative to the clinical note by E. A. Patterson of Rochester, N. Y., on page 1147 of THE JOURNAL, October 17, I want to ask this question: Will sudan III stain liquid petrolatum? As far as I can discover, it stains only fats, and liquid petrolatum oil does not happen to be a fat. I should like to know what THE JOURNAL'S opinion is.

BEN R. ROSS, M.D., Bloomington, Ind.

ANSWER.—Sudan III does not appear to stain liquid petrolatum in the same penetrating way as it stains fat. When Sudan III is mixed with liquid petrolatum under various conditions, there may be a thin coating of the surface of oil globules by a film of the staining solution, but there is no penetration by the stain into the interior of the globule.

Council on Medical Education and Hospitals

COMING EXAMINATIONS

CALIFORNIA: Los Angeles, Feb. 1-4. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 13. Prerequisite to license examination. Address, State Board of Healing Arts, 1895 Yale Station, New Haven.

MINNESOTA: Minneapolis, Jan. 19-21. Sec., Dr. E. J. Engberg, 524 Lowry Medical Arts Bldg., St. Paul.

NATIONAL BOARD OF MEDICAL EXAMINERS: Examinations will be held in cities where there are five or more candidates, Feb. 24-26. Ex. Sec., Mr. Everett S. Elwood, 225 South Fifteenth St., Philadelphia.

NEVADA: *Reciprocity.* Carson City, Feb. 1. Sec., Dr. Edward E. Hamer, Carson City.

NEW YORK: Albany, Buffalo, New York, Syracuse, Feb. 1-4. Chief, Mr. Herbert J. Hamilton, Room 315, State Education Bldg., Albany.

SOUTH DAKOTA: The St. Charles Hotel, Pierre, Jan. 19-20. Dir., Dr. H. R. Kenaston, Bonesteel.

VERMONT: Burlington, Feb. 9-11. Sec., Dr. W. Scott Nay, Underhill.

WASHINGTON: *Basic Science.* Seattle, Jan. 14-15. *Regular.* Seattle, Jan. 18-19. Dir., Mr. Charles Maybury, Olympia.

WYOMING: Cheyenne, Feb. 1. Sec., Dr. W. H. Hassed, Capitol Bldg., Cheyenne.

South Dakota July Report

Dr. H. R. Kenaston, director, Division of Medical Licensure, South Dakota State Board of Health and Medical Examiners, reports the oral, written and practical examination held at Sylvan Lake Hotel, Custer, July 21-22, 1931. The examination covered 15 subjects and included 105 questions. An average of 75 per cent was required to pass. Seven candidates were examined, all of whom passed. Thirteen physicians were licensed by reciprocity with other states. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
College of Medical Evangelists		(1931)	89
Hahnemann Medical College and Hospital, Chicago		(1893)	86.4
Loyola University School of Medicine		(1931)	90.5
Rush Medical College		(1931)	84.5
University of Illinois College of Med.		(1926) 90.1, (1931)	87.3
St. Louis University School of Medicine		(1930)	89.3

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine		(1929)	Wyoming
Northwestern University Medical School		(1925)	N. Dakota
Rush Medical College		(1896)	Minnesota
State University of Iowa College of Medicine		(1924, 2)	Iowa
Harvard University Medical School		(1925)	Michigan
University of Minnesota Med. School		(1926), (1930), (1931)	Minnesota
Creighton University School of Medicine		(1929)	Kansas
University of Nebraska College of Medicine		(1929)	Washington
Medical College of the State of South Carolina		(1923)	Minnesota
Marquette University School of Medicine		(1929)	Wisconsin

Wyoming October Report

Dr. W. H. Hassed, secretary, Wyoming State Board of Medical Examiners, reports the written examination held at Cheyenne, Oct. 5, 1931. The examination covered 12 subjects and included 114 questions. An average of 75 per cent was required to pass. Three candidates were examined, all of whom passed. Eleven candidates were licensed by reciprocity with other states and one candidate was licensed by endorsement. The following colleges were represented:

College	PASSED	Year Grad.	Per Cent
University of Colorado School of Medicine		(1925) 86, (1926)	85
Harvard University Medical School		(1911)	84

College	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Hering Medical College, Chicago		(1905)	Illinois
Rush Medical College		(1929)	Minnesota
Keokuk Med. Coll., College of Phys. and Surgs., Iowa		(1906)	Iowa
St. Louis University School of Medicine		(1906)	Idaho
University of Nebraska College of Medicine		(1925)	Nebraska, (1929) Washington
University of Toronto Faculty of Medicine		(1924)	Minnesota
Osteopaths		Missouri,* Nebraska,* Missouri, 2 †	

College	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Washington University School of Medicine		(1929)	N. B. M. Ex.

* Licensed to practice osteopathy only.
† Licensed to practice osteopathy and surgery.

Bureau of Medical Economics

NET INCOMES FROM MEDICAL PRACTICE
A Supplementary Report

R. G. LELAND, M.D.
Director, Bureau of Medical Economics, American Medical Association
CHICAGO

The recent study of income from medical practice[1] dealt almost entirely with gross incomes. Of the 6,328 income reports studied, 3,782 were from physicians in general practice. By the application of appropriate computations to the figures contained in the reports from the 3,782 physicians in general practice, it was possible to determine the correlation between their gross and their net incomes. The formulas of straight line regression on net income fitted to the data, in which y represents net income and x gross income, are given in table 1.

TABLE 1.—*Formulas of Straight Line Regression on Net Income*

	Population	Formulas of Straight Line
1.	All communities	$y = -465.37 + 0.6756x$
2.	Under 10,000	$y = -331.60 + 0.6646x$
3.	10,000– 24,999	$y = -640.20 + 0.6881x$
4.	25,000– 49,999	$y = -615.90 + 0.7034x$
5.	50,000– 99,999	$y = -496.82 + 0.6949x$
6.	100,000–499,999	$y = -246.57 + 0.6558x$
7.	500,000–999,999	$y = -924.80 + 0.7343x$
8.	1,000,000 and over	$y = -761.62 + 0.6759x$

In general, these equations may be interpreted to mean that except for a constant basic average expense, which varies in different communities, there is a tendency for the net income of general practitioners to be about 67 per cent of gross income.

On the basis of these equations, table 2, giving the estimated average net incomes for each of a series of assumed gross incomes, has been constructed. The figures given in the table were computed by substituting for x the amounts given in the first column under "Assumed Gross Income." Values of net income may be obtained in the same manner for any other assumed amount of gross income. Thus, for instance, the substitution of $2,000 for x in equation 1 gives $886 as being the net income corresponding to $2,000 gross.

TABLE 2.—*Estimated Net Income of Physicians in General Practice Receiving Specified Amounts of Gross Income* *

	Corresponding Estimate of Net Income in Specified Population Groups							
Assumed Gross Income	All Population Groups	Under 10,000	10,000–24,999	25,000–49,999	50,000–99,999	100,000–499,999	500,000–999,999	1,000,000 and Over
$ 0	$ −465	$ −332	$ −640	$ −616	$ −497	$ −247	$ −925	$ −762
1,000	+210	+333	+48	+87	+198	+409	−191	−86
5,000	2,913	2,991	2,800	2,901	2,978	3,032	2,746	2,618
10,000	6,291	6,314	6,240	6,418	6,452	6,311	6,418	5,998
15,000	9,669	9,637	9,681	9,935	9,927	9,590	10,089	9,377
20,000	13,047	12,960	13,121	13,452	13,401	12,869	13,760	12,757
25,000	16,425	16,283	16,561	16,969	16,876	16,148	17,432	16,137
30,000	19,803	19,606	20,002	20,486	20,350	19,427	21,103	19,516

* Computed from linear equations based on data collected by the American Medical Association in 1928. (Assumed gross incomes are for actual amounts collected.)

The computation is as follows: The assumed gross income, which is represented by x in the formulas, is multipled by the decimal preceding x in the formula chosen. The result represents the net income plus a basic expense required to conduct a practice. This basic expense was found to be a constant varying according to the size of community in which the physi-

1. Leland, R. G.: Income from Medical Practice, J. A. M. A. **96**: 1683 (May 16) 1931.

cian practices. The true net, which in these computations is an estimate mathematically derived, is found by deducting the amount in the formula preceded by the minus sign. The process for the $2,000 gross income is, then: $2,000 × 0.6756 = $1,351.20 — 465.37 = $885.83 or, in round numbers, $886.

At a gross income of 0, the values of estimated net income are invariably negative. The amounts shown in the table for the various sized communities opposite 0 assumed gross income represent the minimum average expenditures required to maintain an office. Obviously those expenditures are relatively more important in the lower brackets of gross income than in the higher brackets. For example, at a gross income of $1,000 the estimated net of $210 (for all population groups) represents only 21 per cent of gross; at $5,000 the estimated net income amounts to 59 per cent of the gross, and at $30,000 net makes up about 66 per cent of the gross income. This percentage is practically the same as the ratio of net to gross shown in equation 1, indicating that in the higher incomes the basic expense is relatively negligible.

TABLE 3.—*Relationship* Between Gross and Net Income of Physicians Specializing in Different Fields*

Field of Medicine	Number of Physicians	Normal Equations (y = Net Income)
All specialties	1,758	$y = -794.223 + 0.690486x$
Dermatology	46	$y = -121.968 + 0.630309x$
Eye, ear, nose and throat	473	$y = -767.799 + 0.689944x$
Internal medicine	348	$y = -628.121 + 0.682805x$
Neurology, psychiatry	57	$y = -361.832 + 0.624126x$
Orthopedic surgery	29	$y = +55.862 + 0.602850x$
Pediatrics	182	$y = -1,011.065 + 0.735405x$
Obstetrics and gynecology	149	$y = -1,298.073 + 0.714116x$
Urology	98	$y = -1,150.834 + 0.701780x$
Surgery	304	$y = -991.522 + 0.716601x$
Roentgenology	72	$y = -350.900 + 0.610773x$

* Only those physicians with gross incomes of $30,000 or less were included in the computations. Based on data collected by the American Medical Association in 1928.

A comparison of the figures in table 2 with figures derived by a similar process from data collected from certain sections of the country shows that the two sets of data do not differ to any great extent. Thus, for Shelby County, Ind., the net income corresponding to $1,000 gross is $462, as compared with $333 for communities with a population of less than 10,000 given in the table; for $10,000 gross, the estimated net based on Shelby County incomes is $6,146, as compared with $6,314 in the present study. For Philadelphia and Detroit, net incomes corresponding to $1,000 gross are approximately 0 and —$343, respectively. Reference to the table shows that the estimate based on the figures for this study for populations of 1,000,000 and over is —$86. For $10,000 gross the corresponding estimates of net for Philadelphia and Detroit are $5,990 and $5,360. The figure for Philadelphia compares closely with the amount of $5,998 given in the table. Detroit physicians show higher expenditures and consequent lower net incomes relative to the gross. In San Joaquin County, Calif., the estimated net income corresponding to $10,000 gross is $5,975; in Vermont it is $5,935, each of which amounts corresponds closely to that found in table 2 for the same gross income.

Similar computations were applied to the data contained in the reports from physicians in special fields of practice with the results shown in tables 3 and 4. The figures in table 4 were obtained by substituting for x, in the normal equations in table 3, the amounts of assumed gross income in the first column of table 4. In this way the estimated net income for any specialty may be found by substituting the assumed gross income in the proper equation in table 3; thus, if the estimated net income for an assumed gross income of $9,000 in internal medicine is desired, $9,000 is substituted in the first equation given opposite internal medicine in table 3, as follows:

$$y = -628.121 + 0.682805 \times \$9,000;$$
$$y = \$6,145.25 - 628.12 = \$5,517.$$

In table 4 the amount thus derived is found opposite $9,000 in the internal medicine column.

The net income estimates for eye, ear, nose and throat, internal medicine, pediatrics, obstetrics and gynecology, and surgery are more accurate and dependable since the computations are based on a much larger number of reports than for the remaining specialties studied; however, the coefficient of correlation between gross and net incomes for each specialty included in the study indicates that the estimated amounts derived in table 4 are accurate for all general purposes. Specialties not found in this study were omitted because not a sufficient number of reports were received to make the application of correlation computations at all dependable. Because of the relatively small number of specialists' reports it was not possible to make correlations for each type of special practice according to the size of community.

TABLE 4.—*Estimated Net Income of Physicians Specializing in Different Fields Who Received Specified Amounts of Gross Income**

Assumed Gross Income	Corresponding Estimate of Net Income: All Specialists	Physicians Limiting Their Practice to: D.	O.A.L.R.	I.	N.P.	Or.	Pd.	Ob.G.	U.	S.	R.
$ 2,000	$ 587	$ 1,139	$ 612	$ 737	$ 886	$ 1,262	$ 460	$ 130	$ 253	$ 442	$ 871
3,000	1,277	1,769	1,302	1,420	1,511	1,864	1,195	844	955	1,158	1,481
4,000	1,968	2,399	1,992	2,103	2,135	2,467	1,931	1,558	1,656	1,875	2,092
5,000	2,658	3,030	2,682	2,786	2,759	3,070	2,665	2,273	2,358	2,591	2,703
6,000	3,349	3,660	3,372	3,469	3,383	3,673	3,401	2,987	3,060	3,308	3,314
7,000	4,039	4,290	4,062	4,152	4,007	4,276	4,137	3,701	3,762	4,025	3,925
8,000	4,730	4,921	4,752	4,834	4,631	4,879	4,872	4,415	4,463	4,741	4,535
9,000	5,420	5,551	5,442	5,517	5,255	5,482	5,608	5,129	5,165	5,458	5,146
10,000	6,111	6,181	6,132	6,200	5,879	6,084	6,343	5,843	5,867	6,174	5,757
20,000	13,015	12,484	13,031	13,028	12,121	12,113	13,697	12,984	12,985	13,340	11,865
25,000	16,468	15,636	16,481	16,442	15,241	15,127	17,374	16,555	16,393	16,923	14,918
30,000	19,920	18,787	19,931	19,856	18,362	18,141	21,051	20,125	19,903	20,507	17,972

* Computed from linear equations based on data collected by the American Medical Association in 1928. Only those physicians with gross incomes of $30,000 or less were included in the computations. (Assumed gross incomes are for actual amounts collected.)

It appears from this study that physicians who reported tended to overestimate their net incomes slightly. This may be explained in part by the failure to list expenditures, item by item, on the schedules returned.

These deductions, drawn from data collected in 1928, represent incomes not affected by the general economic conditions experienced during the past two years. The figures, therefore, cannot be used as indicative of physicians' incomes at present without correction for marked diminution in collections and an actual falling off in patients seen. These two items, in the experience of most physicians, will account for a very appreciable shrinkage in actual amounts collected at present as compared with collections in 1928.

535 North Dearborn Street.

Book Notices

Asthma and Hay Fever in Theory and Practice: Part 1. Hypersensitiveness, Anaphylaxis, Allergy. By Arthur F. Coca, M.D., Professor of Immunology, Cornell University Medical College; Part 2. Asthma. By Matthew Walzer, M.D., Instructor in Applied Immunology, Cornell University Medical College; Part 3. Hay Fever. By August A. Thommen, M.D., Lecturer in Medicine, University and Bellevue Hospital Medical College. Cloth. Price, $8.50. Pp. 851, with 102 illustrations. Springfield, Illinois: Charles C. Thomas, 1931.

This treatise is divided into three sections. Part 1, by Coca, deals with the theoretical aspect of hypersensitiveness, anaphylaxis and allergy. The author goes into this study thoroughly and gives a good differential table between anaphylaxis, atopy, hypersensitiveness of infection, contact dermatitis and serum sickness. There is an excellent chapter on the preparation of extracts and solutions used in testing and treating allergic cases, although the nitrogen content system is far from being acceptable to the majority of workers in this field. Part 2, by Walzer, is complete. It considers asthma from every aspect and has an especially good chapter on passive transfer and the various methods of skin testing. There is an excellent chapter on the most important exciting factors, with a detailed description of the ways in which patients can come into contact with each of these; for example, two pages is devoted to the use of rabbit hair in commerce. This section alone is extremely valuable as an aid to elimination of offending factors. Walzer's arguments to show that intracutaneous testing is superior to cutaneous are not convincing, and he apparently does not test his patients with as many different antigens as many others do. Part 3, by Thommen, is on hay fever. There is an excellent treatise on the botany of the different causes, with many illustrations. The discussion of the subject is thorough. The bibliography throughout is large. Because of the exhaustive character of the whole book, it will probably be used chiefly as a reference book of the nature of an encyclopedia and will be most useful.

Estudos neuro-psychiatricos. Por James Ferraz Alvim. Prefacio do Prof. Enjolras Vampré. Paper. Pp. 117, with illustrations. Sao Paulo: A Impressora Ltda., 1931.

Statistics of São Paulo for 1926 show that suicides are most frequent in the male portion of the working class. The greatest number occur between the twenty-first and the twenty-fifth years, and firearms are resorted to the oftenest. The author expresses the thought that the number of suicides may be reduced by proper suggestion both to the individual and to the community. Other chapters discuss varied nervous diseases of general interest. Attention is drawn to Morcio Nery's classification of mental diseases in Brazil. He considers two groups, the first includes the psychoneuroses as seen in patients with normal cerebral development; the second group includes mental diseases in individuals with delayed cerebral evolution (idiocy, cretinism, and so on) or with abnormal cerebral evolution (paranoia, epilepsy, and the like). At the end of each chapter is a Spanish and a French summary. The book is of value to the Spanish speaking medical world.

The Care and Feeding of Adults with Doubts About Children. By Logan Clendening. Cloth. Price, $2.50. Pp. 317. New York: Alfred A. Knopf, 1931.

The success of Dr. Clendening's previous volume is obviously the basis for his continued literary efforts and the issuing of the present manifesto. He thinks originally and expresses himself interestingly in the medical field. Many of the chapters in the present book have appeared in the *American Mercury*, *Collier's*, the *Forum* and similar publications. Dr. Clendening's views are marked more than anything else by rationality and by a tendency to question fads and fancies, and he knows his human beings. Everybody knows that three days' rest in bed is the ideal system for handling a cold, but very few people follow this prescription. The author is particularly doubtful as to the value of health audits and he expresses himself on that subject in no uncertain terms. Even those who disagree with him will enjoy reading his opinions. He joins with several others who have written recently expressing doubts concerning the value of exercising, particularly for men after middle age. Like Don Quixote assailing windmills, he speaks freely on the subject of clothing, a subject in which fashion determines everything and on which those who are really rational are considered insane. His views regarding tobacco and alcohol recognize the fact that there is at this time no scientific evidence to indicate that moderate indulgence in either is particularly harmful to longevity. On the subject of diet he is unwilling to accept much modern practice based on recent knowledge. He is opposed to the fad for weight reduction. The concluding chapters express the doubts of Dr. Clendening on the millennium, on birth control and on the subject of sex, representing reviews of works of some of the leading lights in these fields.

Intravenous Therapy. By K. V. Thakkar, L.M.&S., Chief Medical Officer, Idar State. Foreword by Major General A. Hooton, C.I.E. Cloth. Price, 5 rupees; 8/6 d. Pp. 194, with 8 illustrations. Calcutta: Butterworth & Company, 1931.

This book, published in India, is particularly interesting because of the local color introduced by the special featuring of "Roger's hypertonic saline infusion," which has reduced the cholera mortality to approximately one third, the "best results having been obtained with the largest number of injections per case." Following satisfactory chapters on arsphenamine therapy and blood transfusion, the author gives an alphabetical list of the various drugs in common use for intravenous medication, giving the practical detail for their successful intravenous administration.

Recent Advances in Allergy (Asthma, Hay-Fever, Eczema, Migraine, Etc.). By George W. Bray, M.B., Ch.M., Asthma Research Scholar, the Hospital for Sick Children, Great Ormond Street, London. With foreword by Arthur F. Hurst, M.A., M.D., F.R.C.P., Senior Physicians, Guy's Hospital. Cloth. Price, $3.50. Pp. 432, with 98 illustrations. Philadelphia: P. Blakiston's Son & Company, Inc., 1931.

Particularly welcome in the series of books on recent advances in the fields of medicine is the latest volume on allergy. More confusion exists in this field and more investigation is apparently being undertaken than in any other field of medicine. Unquestionably, much of the confusion is due to a failure to employ common definitions, a situation which the authors endeavor to correct in their opening statements. They distinguish between anaphylaxis and allergy, with a tabular statement that brings forth clearly their point of view. The material is developed on the basis of a complete consideration of the literature and on the author's own experience, which has apparently been extensive. The special sections devoted to asthma and hay fever take account of investigations made in various medical specialties, as do also the sections devoted to food allergies and cutaneous allergy. The literature covered in the book includes material published late into 1930. The volume is supplemented by a competent index.

The Physiology of Muscular Exercise. By the late F. A. Bainbridge, M.A., M.D., D.Sc. Third edition, rewritten by A. V. Bock, M.D.,Ph.D., Assistant Professor of Medicine, Harvard, and D. B. Dill, Ph.D., Assistant Professor of Biochemistry, Harvard. Cloth. Price, $5. Pp. 272, with 46 illustrations. New York: Longmans, Green & Company, 1931.

This classic monograph, the first edition of which was published in 1919, has never enjoyed the general attention from all fields of medical science that it justly deserves. Perhaps this is because of the unassuming title of the work, which for some carries a flavor of the "muscle-twitching days" spent in the laboratory. The salient feature of the book is its integration of all the processes that are associated with exercise. The metabolism of muscle is allocated its proper place as a small part of the general picture. The respiratory exchange, the control of respiration, the behavior of the heart and of the vascular system, diet and the effects of altitude are some of the topics comprehensively treated, with particular attention being paid to the correlation of the changes occurring during exercise. The importance to the practitioner of an understanding of the physiology of exercise in this broad sense is sufficiently obvious, and the present capable revision of a work that stands almost alone in this field deserves wide attention. The volume of the book has been slightly expanded. The revision has been thorough and in full accord with recent advances in the fundamental biologic sciences. The style is exceptionally clear and lucid, serving equally well for general reading and for reference. An adequate but not exhaustive bibliography is supplied.

Medicolegal

Injunction to Prevent Unlawful Practice

(State v. Baker (Iowa), 235 N. W. 313)

Norman G. Baker owned and operated the Baker Institute, at Muscatine, Iowa, for the treatment of certain diseases, particularly cancer, tumors, goiter, prostate gland troubles, stomach ulcers, rheumatism, gallstones and diabetes. Neither Baker nor any of the persons associated with him in the enterprise had ever been licensed to practice medicine in Iowa, except several physicians employed by him at different times, apparently not for the purpose of treating or directing the treatment of patients but ostensibly for the purpose of making diagnoses. The state instituted action to enjoin Baker and his unlicensed associates from practicing medicine in Iowa without first having secured licenses so to do. The district court, Muscatine County, found that all the defendants, except Baker, were unlawfully practicing medicine and enjoined them from continuing to do so. It dismissed the petition so far as Baker was concerned. The state thereupon appealed to the Supreme Court of Iowa.

The Baker Institute itself, said the Supreme Court, was not and could not be licensed to practice medicine. Since it was admitted that the appellee, Baker, was not a licensed physician, the sole question before the court was: "Does the record show that appellee was, or has been, engaged in the practice of medicine in the state of Iowa?"

Baker strenuously denied that he had held himself out as a physician, or claimed to be able to treat diseases or assumed to do so. The Baker Institute, he contended, was a hospital, which he had a right to own and operate, employing licensed physicians to diagnose and treat the patients in it. Each prospective patient was examined by a licensed physician, who wrote his observations on a blank diagnosis chart containing, among other things, a statement of the nature, character and location of the disease from which the patient was suffering. The charts did not contain space for directions as to the medicine or treatment to be administered. Attached to each diagnosis chart, however, when offered in evidence, was a treatment card. All these treatment cards, except one, were signed by a Dr. Bair, and that one was signed by another licensed physician employed at the institute. So far as the record shows, a liquid mixture, the formula of which was known only to the appellee, Baker, and a powder, the formula for which was known only to his associate, Hoxsey, were the sole medicines used in the treatment of cancer, goiter and other diseases. No physician employed at the hospital knew the formula for either of these mixtures. Dr. Bair testified that he had signed hundreds of blank treatment cards but had never signed one on which the designation of the disease or of the treatment prescribed was written. The memoranda on the treatment cards were not in his handwriting. The treatment cards were signed, Dr. Bair testified, at the request or direction of the appellee, Baker. The practice of having Dr. Bair sign blank treatment cards, for some one else to fill out with the name of the ailment and the prescription to be observed in the treatment, said the Supreme Court, was obviously a mere effort to evade the law. Dr. Bair could not by affixing his signature to a blank treatment card, to be pasted on a diagnosis chart, made up many days before the treatment card was signed by him, give any validity to the treatment previously or thereafter prescribed by some one else wholly without his knowledge.

The record did not disclose any occasion on which Baker administered or directly prescribed treatment for any patient, except possibly in four cases concerning which testimony was offered and in which the treatment seems to have been incidental to the general care of the patient. Proof of the actual treatment of patients is not, however, said the Supreme Court, indispensable, and other acts and things come within the prohibition of the statute; it is enough if it be shown that the appellee prescribed the medicine or the treatment to be given the patients. While no one was called as a witness by either party to explain the exact procedure by which the secret formulas of the appellee and of his associate Hoxsey were compounded, the inference to be drawn from the established facts must be that Baker compounded the liquid and Hoxsey the powder. The compounds used were not sold to physicians or to patients by the appellee but were furnished by him under his contracts with the patients directly to them, without the aid of medical skill or advice. The secret liquid preparation must have been furnished by Baker to the persons employed to treat the patients, and this was done without a prescription or direction of a licensed physician. The preparations thus supplied were administered by the treaters to hundreds of patients. The trial court rightly held that the treaters were all practicing medicine. While the appellee, Baker, had a right to sell a proprietary medicine without having a license to practice medicine, that right did not authorize him either to prescribe or to administer that medicine to patients. The merits of the secret formulas used in the treatment of cancer and other diseases at the Baker Institute are not of controlling importance in the case.

The only conclusion to be drawn from the evidence shown in the record, said the Supreme Court, is that the appellee, Baker, was continuously engaged in the violation of certain definite provisions of the laws of Iowa. Both the letter of the law and the spirit thereof were violated. The judgment of the district court, Muscatine County, dismissing as to Baker the state's petition for an injunction could not be sustained. The judgment and decree of that court were therefore reversed and the cause remanded to the district court for a decree in harmony with the opinion of the Supreme Court, with the option, if counsel preferred, of having the Supreme Court itself issue a decree permanently enjoining Baker from practicing medicine in the state of Iowa without a license.

Workmen's Compensation Acts: Heart Disease Plus Trauma Compensable.—The deceased employee went to work digging a trench about 7 o'clock in the morning. About twenty minutes later he was found on the ground with a deep scalp wound caused by striking a sharp object when he fell. He was pronounced dead at 8 o'clock. No one saw him fall. The medical examiner who performed an autopsy certified that death resulted from "hypertensive heart disease, contusion and laceration of the scalp, accidental fall, collapse while at work digging trench." The evidence, said the Supreme Judicial Court of Massachusetts, would warrant the conclusions that the work of the employee was a factor in bringing on a heart attack; that his fall while digging the trench was an incident to his employment, and that his injury was one to which he would not have been equally exposed apart from that employment and arose out of and in the course of his employment. "When a preexisting heart disease of an employee is accelerated to the point of disablement by the exertion and strain of the employment, . . . there may be found to have been a personal injury" within the meaning of the workmen's compensation act. *Madden's Case*, 222 Mass. 487, 496, 111 N. E. 379, 383. "Acceleration of previously existing heart disease to a mortal end sooner than otherwise it would have come is an injury within the meaning of the workmen's compensation act." *Brightman's Case*, 220 Mass. 17, 20, 107 N. E. 527, 528. Where the medical evidence tended to prove that the employee died from the combined effect of heart weakness and the exertion required by his work, that he would not have succumbed and met his death with either of those factors absent, and that both were contributing causes, an award of compensation was justified. *Mooradjian's Case*, 229 Mass. 521-523, 118 N. E. 951.—*Colantueno's Case (Mass.), 175 N. E. 59.*

Society Proceedings

COMING MEETINGS

Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, February 15-16. Dr. William D. Cutter, Secretary, Council on Medical Education and Hospitals, 535 North Dearborn St., Chicago.

Mid-South Post-Graduate Medical Association, Memphis, Tenn., February 9-12. Dr. A. F. Cooper, Bank of Commerce Building, Memphis, Secretary.

Pacific Coast Surgical Association, Coronado, Calif., February 25-27. Dr. E. L. Gilcreest, 384 Post St., San Francisco, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Issues of periodicals are kept on file for a period of five years only. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending, but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Anatomy, New York

49: 167-334 (Nov. 15) 1931

Atrioventricular Conduction System of Beef Heart. J. C. Cardwell and D. I. Abramson, Brooklyn.—p. 167.

Ratios of Cells to Fibers and of Myelinated to Unmyelinated Fibers in Spinal Nerve Roots. H. A. Davenport and S. W. Ranson, Chicago. —p. 193.

Anatomic Ontogeny: (A) Fowl; (C) Rabbit: I. Study of Nuclei of Heart. W. Ehrich and A. E. Cohn, New York.—p. 209.

*Id.: (B) Man: I. Study of Coronary Arteries. W. Ehrich, C. de la Chapelle and A. E. Cohn, New York.—p. 241.

Peritoneal Reactions in White Rat, with Especial Reference to Mast Cells. R. L. Webb, Chicago.—p. 283.

Anatomic Ontogeny.—The investigations of Ehrich and his associates are based on an examination of fifty-one hearts of human beings ranging in age from birth to 97 years. The coronary arteries were injected with a barium sulphate mixture and studied both macroscopically and microscopically. The macroscopic method, utilizing roentgenograms, was found to be unsuitable in studying the blood supply of the heart; a method of counting the arteries is described which yielded satisfactory results. The best method for arriving at the actual dimensions of the arteries is one in which they are measured histologically. The authors found that the duration of growth of the arteries is as long as that of the heart. Whether the period of growth of the arteries is longer than that of the heart could not be ascertained in this study, because of inadequate material, but this is probably the case. The growth of the coronary arteries after the sixth decade is furthermore conditioned, not essentially by dilatation but principally by increase in the thickness of the layers of their walls. The transverse sectional area of the lumens grows proportionately to the weight of the heart. The blood supply to the two ventricles, as described by Gross in the sense that relative anemia of the wall of the right ventricle increased with age, was not confirmed. The blood supply of the right ventricle increases, moreover, like that of the left, in direct proportion to the growth of the two ventricles in weight, as an expression of which the blood supply of the left ventricle increases about twice that of the right. The duration of growth of the media is as long as that of the arteries, the nuclei enlarging and increasing continuously. The nucleoplasmic ratio, on the other hand, decreases. Increase in the thickness of the intima is conditioned by the evolution of a hyperplastic layer which later becomes subject to atherosclerotic changes. Splitting of the inner limiting lamella and atherosclerosis occurred earlier, and these conditions were more conspicuously developed than in comparable hearts of European subjects described by Wolkoff and Bork.

American Journal of Physiology, Baltimore

97: 547-725 (Nov.) 1931

Note on Posture of Bird's Wing, and Its Supposed Control by Sympathetic Nerves. O. W. Tiegs, Melbourne, Australia.—p. 547.

Studies in Gastric Secretion: III. Evidence in Refutation of Rosemann Theory of Hydrochloric Acid Formation. F. Hollander, Cold Spring Harbor, Long Island.—p. 551.

Studies on Overdistended Heart: I. Effects of Venesection. W. A. Brams and L. N. Katz, Evanston, Ill.—p. 556.

Id.: II. Rôle of Relaxation in Filling Distended and Overdistended Heart. L. N. Katz and W. A. Brams, Evanston, Ill.—p. 569.

Excretion of Urine in Dog. I. Urea and Creatinine Clearances on Mixed Diet. N. Jolliffe and H. W. Smith, New York.—p. 572.

*Studies on Urinary Excretion of Estrin, with Especial Reference to Effect of Luteinizing Hormone and Progestin. G. van S. Smith and O. W. Smith, Brookline, Mass.—p. 578.

Effect of Vagus on Diastolic Size of Heart and Its Bearing on Question of Cardiac Tonus. G. Crisler and L. J. van Liere, Morgantown, W. Va.—p. 585.

Studies in Physiology of Vitamins: XVI. Effect of Exercise on Time Required for Development of Anorexia Characteristic of Lack of Undifferentiated Vitamin B. G. R. Cowgill, H. A. Rosenberg and J. Rogoff, New Haven, Conn.—p. 589.

Influence of Physical Training on Basal Metabolic Rate of Man. E. C. Schneider and A. O. Foster, Middletown, Conn.—p. 595.

Bile Flow and Bile Pigment Output After Denervation of Liver. H. Lundberg, Rochester, Minn.—p. 602.

Studies on Carbohydrate Metabolism Following Denervation of Liver. J. M. Donald, Rochester, Minn.—p. 605.

Formed Elements of Blood, Coagulation Time, Peptone Leukopenia After Section of Nerves to Liver. F. C. Hill, Rochester, Minn.—p. 610.

*Effect of Denervation of Liver on Secretion of Bile. L. V. Hillyard, Rochester, Minn.—p. 612.

Heat Regulation and Water Exchange: XIII. Insensible Weight Loss and Liver Hydration in Onset of Cocaine Fever. H. T. Marshall, B. F. Aydelotte and H. G. Barbour, Louisville, Ky.—p. 615.

*Some Factors Regulating Utilization of Splenic Iron. S. F. Cook and N. M. Spilles, Berkeley, Calif.—p. 626.

*Blood Regeneration Studies: I. Changes in Volume, Number and Size of Erythrocytes in Hemorrhagic Anemia. Jane E. Leichsenring and Hortense H. Honig, Minneapolis.—p. 636.

Comparative Studies on Peripheral and Central Retina: IV. Temporal Summation of Subliminal Visual Stimuli and Time Course of Excitatory After-Effect. R. Granit and W. A. Davis, Philadelphia.—p. 644.

Comparative Studies on Peripheral and Central Retina: V. Sensation-Time Curve and Time Course of Fusion Frequency of Intermittent Stimulation. R. Granit and E. L. Hammond, Philadelphia.—p. 654.

Id.: VI. Inhibition, Summation and Synchronization of Impulses in Retina. C. H. Graham and R. Granit, Philadelphia.—p. 664.

Relation of Cortin to Maintenance of Body Temperature. F. A. Hartman, Katharine A. Brownell and A. A. Crosby, Buffalo.—p. 674.

Pupillary Dilatation Produced by Direct Stimulation of Tegmentum of Brain Stem. W. R. Ingram, S. W. Ranson and F. I. Hannett, Evanston, Ill.—p. 687.

Basal Metabolism of Oklahoma Women. Callie Mae Coons, Stillwater, Okla.—p. 692.

Basal Metabolism in Relation to Nutritional Status. Callie Mae Coons, Stillwater, Okla.—p. 698.

Capillary Pressure and Hyperemia in Muscle and Skin of Frog. E. M. Landis, Copenhagen, Denmark.—p. 704.

Urinary Excretion of Estrin.—The Smiths demonstrated a lowering of the level of estrin in pregnant patients receiving luteinizing hormone. Experiments on normal and on spayed doe rabbits receiving theelin alone and theelin together with the luteinizing hormone or progestin led to the conclusion that progestin causes the excretion of estrin. This observation may explain the failure to recover estrin in the urine in the majority of human amenorrhea and sterility cases in which the patients are receiving large amounts of this hormone. The possible importance of the corpus luteum in promoting the excretion of estrin during the menstrual cycle and early pregnancy is discussed.

Bile Secretion After Denervation of Liver.—Hillyard made a study to determine whether the increase in the secretion of bile that follows the ingestion of food is dependent on the hepatic nerves. Five dogs were operated on, the gallbladder being removed and biliary fistulas made. After a sixteen hour fast, each dog was placed on a collecting table and specimens of bile were collected as controls. The dog was then fed a test meal, and bile was collected at regular intervals thereafter. It was found that a mixed meal caused the greatest increase of biliary secretion; a protein meal caused a marked increase; a fat meal usually caused a moderate increase; occasionally there was neither increase nor decrease, and a carbohydrate meal gave variable results: either an increase or a slight decrease, or the output remained the same. After these control observations had been made on the animals, the hepatic nerves were sectioned. Fasting, feeding and collections were carried out as before, and it was noted that each of the foregoing test meals produced about the same increase in biliary secretion as before denervation. These observations show that the increase in biliary secretion after the ingestion of food is not dependent on the nerves to the liver.

Factors Regulating Utilization of Splenic Iron.—According to Cook and Spilles, the relative amount of iron in the spleen decreases with age, the rate of the withdrawal decreasing with age. The proportion of iron to the weight of the spleen bears a negative relation to the body weight, the coefficient of correlation of these two values being minus 0.82 plus or minus 0.045. The addition of small amounts of copper to an iron-low diet results in greater depletion of the reserve iron of the spleen. When copper is added to a dietary supplied with sufficient iron, the amount of splenic iron is greatly

increased, while iron alone does not produce an augmentation of the splenic reserve. An explanation for this phenomenon is offered.

Blood Regeneration.—Seven dogs rendered anemic by the removal of approximately half of their determined total blood volume were observed by Leichsenring and Honig for a period of twelve weeks following hemorrhage. The diets used were not very satisfactory for blood regeneration, although as good results were obtained with an animal on a diet of table scraps as with animals on the synthetic diet. The total cell volume percentage was unaltered throughout the entire postbleeding period; the average for the group at the end of the experiment was identical with the first determination following bleeding. The red cell count had returned to normal by the eighth week of the postbleeding period and thereafter increased considerably above the normal prebleeding level. The diameter of the red blood cells decreased during the regeneration period from an average of 6.9 microns before bleeding to an average of 6.1 microns at the end of the postbleeding period. One animal which was studied for an additional eight week period showed a continued decrease in cell diameter during this period, although the cell volume percentage approached the normal and red cell count was much above the normal at the end of this time. Throughout the postbleeding period there was a steady decrease in the proportion of normal size cells and an increase in the proportion of cells of much smaller size. Curves illustrating the scatter in cell diameter show that the normal curve is fairly symmetrical and has a narrow spread. The curve for hemorrhagic anemia lies to the left of the normal, has a wider spread, and is asymmetrical in type. Calculation of the individual red cell volume showed a steady diminution in cell volume which was synchronous with the decrease in cell diameter. A rapid increase in the number of red cells was associated with a marked decrease in cell diameter and individual cell volume.

American Journal of Syphilis, St. Louis

15: 449-606 (Oct.) 1931

*Study of Blood Picture in Congenital Syphilis and Effect of Antisyphilitic Therapy on Hemoglobin and Cellular Elements. H. H. Perlman and C. S. Wright, Philadelphia.—p. 449.
*Serologic Results in Malarially Treated General Paralysis. J. E. Nicole and E. J. Fitzgerald, Winwick, England.—p. 496.
Treatment of Early Neurosyphilis. A. B. Cannon, New York.—p. 517.
Comparative Study of Cardiovascular Syphilis in White and Colored Races. T. Z. Cason, Jacksonville, Fla.—p. 527.
*Unusual Signs from Expansive Chiari Network Along with Signs of Syphilitic Aortic Regurgitation. J. A. Alvarez, Fort Smith, Ark., and G. Herrmann, Galveston, Texas.—p. 532.
Syphilis of Bone Resembling Osteitis Deformans. L. B. Duggan, St. Louis, and L. Bromberg, Chicago.—p. 538.
*Cistern Puncture. L. Jacobi, New York.—p. 544.

Blood Picture in Congenital Syphilis.—Perlman and Wright present the results of a study that was instituted for the purpose of accurately determining the value of complete blood counts (red blood cell, white blood cell and differential counts) in the diagnosis or prognosis of congenital syphilis, and the effect of therapy on the blood picture. Although the actual number of cases studied was small, the authors believe that the study has a particular value in that all the blood examinations were made by the same technician, a technician highly specialized in this type of work, thus eliminating all sources of error. As a result of the studies, they are forced to conclude that the secondary anemia present in congenital syphilis is like all anemias associated with chronic infectious disease; and furthermore, that the degree of anemia may be no more and no different from that found in supposedly healthy children. No reliance can be placed on the degree of anemia as a diagnostic sign, nor does the study of the individual cells reveal anything of diagnostic or of prognostic importance. However, no cases of true syphilitic anemia were encountered in the study. Treatment with compounds of arsenic or bismuth or with a combination of these two drugs had a variable and inconsistent effect on the secondary anemia when present and on the differential count. This is in contrast with previously reported studies on the effect of mercury, which is a hemolytic agent, although, paradoxically, mercury may cause an increase in hemoglobin in a patient with true syphilitic anemia.

Malarially Treated Dementia Paralytica.—Nicole and Fitzgerald state that in dementia paralytica the cerebrospinal fluid improves after malaria, sometimes becoming completely normal. Such changes take considerable time to occur, being most marked, on an average, when four or more years has elapsed since the onset of the treatment, the cell count and the Boltz reaction improving earlier than the Lange. The serologic improvement bears no relation to the clinical condition. The improvement does not appear to be related to the number of courses of malaria given, for even though further improvement may occur after a second course it cannot be proved that this was not due merely to the passing of more time since the first course. No single specific syphilitic test is to be relied on in treated patients without being confirmed by at least one other test. Even these specific tests may, and do, become negative in the absence of any intense antisyphilitic treatment (apart from malaria).

Syphilitic Aortic Regurgitation.—A case of syphilitic heart disease and aortic regurgitation with congestive failure is reported by Alvarez and Herrmann because of the unique physical signs encountered in the physical examination of the patient. The postmortem observations of syphilis of the aorta along with the anomaly, namely, the Chiari network, are described in detail. This is apparently the explanation of the peculiarity of the murmur noted during life. A discussion is offered in which the previous cases are reviewed with the theories of the embryologic development. Stress is placed on the clinical recognition of the anomaly along with its importance and the sequelae that might result from such a condition.

Cistern Puncture.—According to Jacobi, cistern puncture is a comparatively safe method of obtaining spinal fluid. The after-effects of cistern puncture are insignificant, and rest in bed is unnecessary. These advantages rob the spinal test of all its former terrors and make its routine performance on the ambulatory patient possible and advisable. While cistern puncture finds its greatest field of usefulness in syphilology, there are other important diagnostic and therapeutic applications of the procedure.

American Review of Tuberculosis, New York

24: 491-604 (Nov.) 1931

*Study of Tuberculosis in Junior High School in Honolulu. S. E. Doolittle, Honolulu.—p. 491.
Racial Susceptibility to Tuberculosis. E. Bogen, Olive View, Calif.—p. 522.
Tuberculous Infection Among School Children in Rural Area in New York State. J. H. Korns, Olean, N. Y.—p. 532.
*Koumiss in Dietetic Treatment of Pulmonary Tuberculosis. C. L. Rubenstein, Duarte, Calif.—p. 537.
Pleural Shock. C. H. Cocke, Asheville, N. C.—p. 545.
*Study of Position of Primary Cavities in Pulmonary Tuberculosis. H. C. Sweany, Carol E. Cook and R. Kegerreis, Chicago.—p. 558.
Demonstration of Rare Tubercle Bacilli in Sputum. J. E. Pottenger, Monrovia, Calif.—p. 583.
*Potato-Egg Medium for Isolation of Tubercle Bacilli. J. S. Woolley and F. G. Petrik, Loomis, N. Y.—p. 596.

Tuberculosis Survey in Honolulu.—Doolittle states that application of the tuberculosis survey method to one representative junior high school in Honolulu yielded information which assists in evaluating the method as used under local conditions and which is suggestive of important epidemiologic facts to be acquired by a continuation of the survey. One thousand four hundred and thirty-seven students tested (of age group 11 to 18 years) gave 75.57 per cent positive tuberculin reactions with cutaneous and intracutaneous tests carried to doses of 1 mg. Cutaneous tests gave 532, or 37 per cent, positive reactions, less than half as many as the complete series of intracutaneous tests. Roentgenologic examinations of all positive reactors revealed 13 cases of adult pulmonary tuberculosis, 10 of suspected pulmonary tuberculosis, and 175 lesions classified as of the childhood type (including pleurisy). Probably nearly all of the last group were latent or nearly healed. These demonstrable roentgen lesions occurred practically entirely in those reacting positively to tuberculin. Of this group, 1.2 per cent showed adult pulmonary tuberculosis, and the frequency of total demonstrable lesions in the group was 18.8 per cent. Lesions were most frequent among reactors to cutaneous tests or intracutaneous tests with dosage of 0.1 mg. or below. Males showed a higher incidence of tuberculous infection than females, but adult pulmonary tuberculosis was more frequent among females, and the percentage of total demonstrable roentgen lesions was prac-

tically identical in the two sexes. Infection was more frequent in the older age groups. The average age of the group studied was 14 years. The study of infection in relation to race shows, when numbers are sufficient for any comparison, high rates of infection among Chinese and low rates among Portuguese, with Japanese and part-Hawaiian falling between these two. The history of home contact with tuberculosis, as obtained by routine questioning through the school personnel, is incomplete and unsatisfactory, but the group having positive histories showed ten times as many positive as negative reactions. The statement "whether well or not," as related by both pupil and teacher, showed little correlation either with tuberculous infection or with demonstrable roentgen lesions, even of the adult pulmonary type. Infection, as evidenced by positive skin tests, did not affect the periods of absence from school because of illness. A difference of only 4.5 per cent was found in the group with demonstrable lesions having absences of over three days. Neither infection nor demonstrable changes in the lungs or in the lymph nodes affected the proportion of children 10 per cent or more underweight. The relative weight gain showed the greatest alteration in the group with adult pulmonary tuberculous lesions and a barely perceptible degree of variation when there were demonstrable latent childhood lesions or mere tuberculous infection. Temperature records did not show appreciable differences in those with positive skin tests, tuberculous infection or demonstrable roentgen lesions.

Koumiss in Dietetic Treatment.—Rubenstein calls attention to the fact that in western Europe and parts of Asia koumiss has long been used with marked success in the dietetic treatment of pulmonary tuberculosis. It is recommended for its ideal balancing of albumin, fats, carbohydrates and mineral salts. The dietetic value of koumiss and its quick assimilation by the body make it preferable to other dietetic methods of treatment of pulmonary tuberculosis. The nature of the koumiss treatment closely resembles "irritation therapy." In large doses it is apt to produce an unfavorable reaction of a specific nature. In therapeutic doses it increases the immunobiologic properties of the organism. It has diuretic and sedative properties. Under its influence the sputum becomes more fluid, and expectoration is facilitated. The general blood picture is improved by the koumiss treatment. The du Costa and the sedimentation reaction are valuable auxiliary methods for control of the koumiss treatment. A careful selection of cases, exact dosage of koumiss and continuous observation of the patient are necessary when the treatment is given. Dry regions, such as Arizona, New Mexico, Texas and southern California, offer favorable locations for the establishment of koumiss sanatoriums.

Position of Primary Cavities.—Sweany and his associates report a study of the localization by means of stereoscopic roentgen examination of primary cavities of reinfection in pulmonary tuberculosis. There were 268 cavities measured in 204 patients with respect to size, posterior rib level, percentage from the midline and percentage posterior. On the basis of their observations the authors conclude that the cavities seem to be situated in definite lung regions, mostly in the posterior and outer part of the upper lobes and the apexes of the lower lobes. About 98 per cent of early cavities seem to be situated on bronchi that are directed rather sharply posteriorly; in fact, the posterior aspect of the bronchi seems to be the one most important common factor. An attempt was made to place the lesions with respect to bronchial branches. The posterior subapical rami seem to be involved most frequently, 53.8 per cent; the apical, 18.5 per cent; the horizontal, 11 per cent, and the apex of the lower lobe, 13.7 per cent. Others were insignificant. Most cavities are situated from 1.5 to 3 cm. beneath the pleura corresponding to the fourth and fifth order of bronchi, and consequently nearly all are "infraclavicular." The distribution of the lesions on the right and on the left side appears to be directly proportional to the lung volume of these respective sides. The position of these cavities indicates a common mechanical factor of origin. It also suggests a bronchogenic origin resulting from a lack of clearing facilities of the particular bronchi or from some similar mechanical principles.

Potato-Egg Medium.—Woolley and Petrik describe a solid medium for isolating tubercle bacilli from contaminated material. This medium is essentially glycerinated potato extract in an egg base. In it the growth-promoting qualities of the potato and the nutrient value of egg (yolk) are utilized. In a series of comparative tests, with over 100 sputums, the potato-egg medium gave a much higher percentage of isolations of tubercle bacilli than the potato-cylinder medium described by Corper. It also yielded results superior to those of Petroff's meat-egg medium. It gave similar results with either alkali-treated or acid-treated sputums, but the alkali method of digestion is preferred. An incomplete study indicates that it is necessary to seed at least twenty tubes of this medium to equal guinea-pig inoculation when the animal receives considerable amounts of material. However, positive results can be determined more readily and earlier by the culture method than by inoculation.

Annals of Surgery, Philadelphia

94: 801-960 (Nov.) 1931

Idiopathic Dilatation of Esophagus. F. A. C. Scrimger, Montreal.—p. 801.
*Pyloric Sphincter and Duodenal Ulcer. J. B. Deaver and V. G. Burden, Philadelphia.—p. 818.
*Hemangioma of Sigmoid and Colon. F. W. Bancroft, New York.—p. 828.
Some Angiospastic Syndromes in Extremities. J. J. Morton and W. J. M. Scott, Rochester, N. Y.—p. 839.
Diagnosis and Principles of Treatment of Carcinoma of Colon and Rectum. D. F. Jones, Boston.—p. 860.
*Relaxation of Scar Contractures by Means of Z or Reversed Z Type Incision: Stressing Use of Scar Infiltrated Tissues. J. S. Davis, Baltimore.—p. 871.
"Avertin" Anesthesia: From Anesthetist's Standpoint. J. Kreiselman, Washington, D. C.—p. 885.
Id.: From Surgical Standpoint. C. S. White, Washington, D. C.—p. 888.
Results of "Avertin" Basis Anesthesias, with Ether, Nitrous Oxygen and Ethylene, Based on Clinical and Metabolic Studies: Seven Hundred Cases. H. Widenhorn, Freiburg, Germany.—p. 892.
Study of Spinal Analgesia Based on Three Hundred and Fifty-Seven Personal Cases. E. Garside, New Orleans.—p. 899.
Spinal Anesthesia: Spinal Anesthesia Questionnaire and Series of Spinal Anesthesias. R. R. Cranmer and E. C. Henrikson, Minneapolis.—p. 915.
Spinal Anesthesia on a General Surgical Service. E. W. Saunders, New York.—p. 931.
Spinal Anesthesia with Nupercaine and Procaine. A. Harris and L. G. Goldberg, Brooklyn.—p. 934.
Suturing Bones of Forearm. I. Zadek, New York.—p. 939.

Pyloric Sphincter and Duodenal Ulcer.—According to Deaver and Burden, duodenal ulcer usually occurs in individuals who have a constitutional hyperacidity. From experimental and clinical studies it seems that acid is the direct causative factor in the initiation and maintenance of duodenal ulcer. That ulcer does not develop in all individuals with temporary or persistent hyperacidity is probably due to the safety control mechanism of duodenal regurgitation. Studies have shown that patients with ulcer have deficient duodenal regurgitation or are unable to neutralize efficiently acid injected into the stomach. The clinical symptoms of ulcer can be explained on the basis of pylorospasm. Dysfunction of the pyloric sphincter not only causes the symptoms of ulcer but precedes the appearance of ulcer. The combination of dysfunction of the pyloric sphincter and hypersecretion of acid gives rise to duodenal ulcer. The control of the hypersecretion of acid is difficult and uncertain by medical means alone. The other factor, the pyloric sphincter, in the etiology of ulcer can be removed by a surgical procedure. Removal of the anterior half of the pyloric sphincter permits uninterrupted regurgitation of duodenal contents into the stomach, thereby attaining control of acidity. This operation does all that gastroenterostomy can do and all that medical treatment tries to do. It restores nature's method for the control of acidity. It is based on sound physiologic principles. It is generally agreed that when gastric acidity is controlled a duodenal ulcer will heal and that symptoms will disappear when pylorospasm is relieved. The operation on the sphincter accomplishes both objectives. The advantage of the operation is its simplicity of performance: there is no disturbance of anatomic relationships and there is no opportunity for the development of anastomotic ulcer. In the authors' practice, submucosal removal of the anterior half of the pyloric sphincter is the operation of choice for duodenal ulcer.

Hemangioma of Sigmoid and Colon.—Bancroft states that hemangioma of the rectosigmoid is usually congenital in origin. The most prominent symptom is repeated bleeding from the

rectum, usually beginning in the first decade of life. The condition is serious, as death from hemorrhage is apt to occur. The treatment in the cases reported has been, in general, unsatisfactory. The author reports a case wherein a cure was accomplished by the injection of the superior hemorrhoidal vein with a sclerosing solution. Colostomy and later closure of the colostomy were performed in order to put the bowel at rest during the period of repair.

Relaxation of Scar Contractures.—As Davis uses the Z-type incision to relax scar contractures the scar is not removed, but the contraction is relieved, by the transposition of flaps which are usually composed of scar or of scar-infiltrated tissue, in such a way as to break the line of scar pull. The suture line after transposition of the flaps is, in a general way, the reverse of the original incision. It is difficult to realize how much permanent relaxation can be secured by the use of scar-infiltrated tissue and this type of incision, until one is familiar with the procedure and its possibilities. The method has simplified the handling of many cases in which the patient would otherwise have had to undergo a much more extensive and serious operative procedure in order to obtain relief. The Z-type incision has been of great use to the author when dealing with contractures in all parts of the body. He has utilized it in a large series of cases and considers it one of the most generally useful maneuvers in his armamentarium.

Archives of Dermatology & Syphilology, Chicago

24: 725-936 (Nov.) 1931

*Autohemic Treatment of Rhus Toxicodendron Dermatitis. E. Grimes, Des Moines, Iowa.—p. 725.
*Jugular Compression: An Adjunct in Treatment of Syphilis of Central Nervous System. D. C. Smith and J. A. Waddell, Charlottesville, Va.—p. 727.
*Relationship of Serology of Blood to That of Spinal Fluid in Congenital Syphilis. F. W. Cregor, Indianapolis.—p. 733.
*Presence of Uneven Quantities of Bismuth in Oily Bulk Suspension of Bismuth Salts. H. N. Cole, Katharine I. Henderson, W. F. von Oettingen and T. Sollmann, Cleveland.—p. 739.
*Fatal Iododerma. J. J. Eller and E. C. Fox, Dallas.—p. 745.
Multiple Lesions of Skin Apparently of Epithelial Origin Resembling Clinically Mycosis Fungoides: Case. L. W. Ketron and M. H. Goodman, Baltimore.—p. 759.
Lupus Erythematosus Disseminatus. W. H. Mook, R. S. Weiss and L. K. Bromberg, St. Louis.—p. 786.
Relationship of Dermatitis Exfoliativa Neonatorum Ritter and Impetigo Bullosa in Adult. S. J. Zakon, Chicago.—p. 830.
Early Epithelioma. L. Savatard, Manchester, England.—p. 835.
Tuberculide en Plaque. S. E. Sweitzer, Minneapolis.—p. 842.
Dermatology in Soviet Russia. H. Fox, New York.—p. 853.

Autohemic Treatment of Rhus Toxicodendron Dermatitis.—In a series of cases of Rhus toxicodendron dermatitis, Grimes injected the patient's own whole blood into the muscular tissues. This treatment was suggested by the rapid disappearance of this type of dermatitis following a trauma with extravasation and ecchymosis. The effect of the treatment has justified the conclusion that the patient's own whole blood is a rapidly acting specific, and probably of prophylactic value.

Jugular Compression.—Smith and Waddell report that a small series of cases showed an increase of 55 per cent in the arsenic content of the spinal fluid following jugular compression as compared with controls. All the test cases showed the presence of arsenic. Theoretical and experimental data support the idea that jugular compression is a useful adjunct in treatment in selected cases of neurosyphilis.

Congenital Syphilis.—Cregor believes that the child in utero encountering early syphilis in the mother during its early or middle uterine life most surely faces destruction if therapy is not instituted, whereas the child in utero encountering latent syphilis in the mother has a better chance to survive. He may suffer greatly from a prolonged syphilotoxemia, and he represents the large number of patients showing dystrophic stigmas. The Wassermann test and color reactions are of distinct service in inherited syphilis, whereas tests for albumin and cell counts are of service only after other infections have been ruled out.

Bismuth in Oil.—Cole and his associates present the results of an investigation from which they conclude that there may be variations as great as 41 per cent in dosages taken from the same bottle of bismuth salt suspension, and with one preparation even 90 per cent. In other words, one does not always give the dose one expects. The variation was least marked with a bismuth salicylate cream; it was greater with an oil suspension of bismuth subsalicylate and still greater with a potassium bismuth tartrate. The greatest variation was in a suspension of sodium potassium bismuth tartrate iodobismuthate of quinine in camphor in oil. Moreover, this shows an even greater variability in the ratio of the two bismuth compounds in samples from the top and from the sediment in a 25 cc. bottle. Other things being equal, soluble solutions of bismuth salts will allow more exact dosage. This refers to exactitude of dosage only, the question of type of salt not entering into this consideration. If a more exact dosage is important, it could perhaps be secured by the use of a mechanical mixer.

Iododerma.—Eller and Fox report a fatal case of eruption due to the ingestion of iodide, with unusual clinical features. Microscopic studies revealed a peculiar inflammatory process which was difficult to interpret and which in some stages was suggestive of a neoplasm. A study of the rapid evolution and involution of the lesions, with the finding of large amounts of iodides in the urine, skin, kidneys and liver, could only lead one to the conclusion that the eruption was due to the iodides. It can easily be conceived that, following the ingestion of iodized salt for some years, the patient in the case reported was sensitized to such an extent as to develop a fatal iododerma after the ingestion of a tonic containing small amounts of potassium iodide. As other cases are on record of eruptions from the use of iodized salt, even though not severe, the authors believe that the indiscriminate use of iodized salt should be avoided and that the medical profession should warn the public of this danger.

Archives of Surgery, Chicago

23: 715-888 (Nov.) 1931

*Intracapsular Fractures of Neck of Femur: Treatment by Internal Fixation. M. N. Smith-Petersen, E. F. Cave and G. W. Vangorder, Boston.—p. 715.
Mediastinal Emphysema. P. M. Jessup, Fort Wayne, Ind.—p. 760.
*Lymphatic Vessels of Thyroid Gland in Dog and in Man. W. F. Rienhoff, Jr., Baltimore.—p. 783.
*Primary Carcinoma of Jejunum: Case. F. I. Harris and H. Rosenblum, San Francisco.—p. 805.
Osteogenic Sarcoma of Left Tibia in Patient with Osteitis Deformans. P. J. Breslich, Chicago.—p. 813.
Congenital Malformations of Intestinal Tract and Bile Ducts in Infancy and in Childhood. W. H. Cole, St. Louis.—p. 820.
Experimental Shock: XI. Study of Alterations in Volume of Blood and in Water Content of Blood and of Muscle That Are Produced by Histamine. Virginia Butler, J. W. Beard and A. Blalock, Nashville, Tenn.—p. 848.
*Id.: XII. Study of Effects of Hemorrhage, of Trauma to Muscles, of Trauma to Intestines, of Burns and of Histamine on Cardiac Output and on Blood Pressure of Dogs. G. S. Johnson and A. Blalock, Nashville, Tenn.—p. 855.
Review of Urologic Surgery. A. J. Scholl, Los Angeles; E. S. Judd, Rochester, Minn.; L. D. Keyser, Roanoke, Va.; Jean Verbrugge, Antwerp, Belgium; A. A. Kutzmann, Los Angeles, and A. B. Hepler, Seattle.—p. 864.

Fractures of Femur.—Smith-Petersen and his associates call attention to the fact that nails of various types, either round or square, have been used for internal fixation of intracapsular fractures of the neck of the femur with varying success. This type of treatment has been abandoned because it brought about partial and temporary fixation only. Since the fixation was only partial, immobilization by means of a plaster cast had to be superimposed on the open operation until repair was far enough advanced to stand the strain of function. Since early function is the most important principle in the treatment of any joint fracture, this type of treatment necessarily fell short of the ideal. The type of nail previously used brought about temporary fixation only. This was due to the fact that the nail was massive; it displaced so much bone that it actually created pressure necrosis surrounding it. Because of this necrosis, within a short time the nail became loose and ceased to function. To eliminate these two weak points the authors devised a flanged nail which brings about absolute fixation in all directions and displaces a minimum amount of bone. Because of its flanges the nail is gripped by the cortex of the bone, so that there can be no rotation; because of its shape the surface area is much greater than that of the ordinary nail, and friction is proportionately increased; because of the minimum

displacement of bone there is less pressure necrosis surrounding it; consequently the fixation is sustained and complete, not temporary and partial. In the treatment for joint fractures, anatomic reduction and early function are the two salient principles. Heretofore, the different methods of treatment for fractures of the neck of the femur have accomplished but one of these. Anatomic reduction has been achieved in the majority of cases, but early function has been impossible. The internal fixation of the fracture brought about by the three-flanged nail is absolute in all directions. Furthermore, it is a sustained fixation as well. Because of this absolute, sustained fixation, postoperative immobilization is eliminated and early function is made possible. Early function means better chance of bony union and better ultimate function.

Lymphatic Vessels of Thyroid.—Rienhoff accomplished complete injection of the lymphatic vessels of the thyroid of the dog by filling the lymphatic channels at a point remote from the gland. A comparative study was made of the human thyroid as well as of the thyroid of the guinea-pig and of the cat. The lymphatic system of the thyroid was found to be a closed one. The author believes that it is unlikely, from a purely structural standpoint, that the specific secretion of the gland is transmitted by this system.

Carcinoma of Jejunum.—Harris and Rosenblum emphasize the fact that, in cases of primary carcinoma of the jejunum that have been reported, this growth is noted for its infrequency. The history of a case reported by them illustrates the error that is frequently made; namely, the diagnosis of this condition as pernicious anemia. Roentgen examinations by a competent man may also give erroneous results, unless the clinician directs the roentgenologist's attention to a careful examination of the intestinal tract immediately beyond the stomach. Insufficient importance is attached to the patient's complaint of pain in the lower portion of the back, which is associated with severe anemia. This symptom should make one suspect the presence of a tumor in the region of the pancreas. The reference of pain from lesions in this locality is not generally known, and in cases of anemia it is often assumed to be due to the usual asthenia associated with both primary and secondary anemia. Early diagnosis lends hope for radical resection with cure, as distant metastases are relatively infrequent. The case presented demonstrates an advanced growth which showed extension only into the immediate retroperitoneal region of the pancreas and the stomach, with no involvement of the adjacent mesenteric lymph nodes.

Experimental Shock.—Johnson and Blalock determined the cardiac output and blood pressure repeatedly in experiments on the effects of (1) graded hemorrhages, (2) trauma to an extremity, (3) trauma to the intestine, (4) burns and (5) the subcutaneous injection of histamine. Hemorrhage and the various types of injury were associated with a significant decline in the output of the heart, followed by a drop in the blood pressure. On the other hand, following the injection of histamine, the blood pressure declined first and the cardiac output subsequently. No evidence for the initiating action of histamine in the production of traumatic shock was found in these experiments.

California and Western Medicine, San Francisco

35: 337-408 (Nov.) 1931

Fundamental Conceptions of Psychiatry Necessary to Intelligent Practice of Medicine. G. G. Hunter, Los Angeles.—p. 337.
*Narrow Bispinous Diameter: Its Influence on Occiput Posterior Positions. S. H. Hanson, Stockton, Calif.—p. 340.
Carbon Dioxide Absorption from Anesthetic Mixtures. R. M. Waters, Madison, Wis.—p. 342.
*Penetrating Wounds of Chest. H. W. Stephens and S. Cohn, San Francisco.—p. 351.
Cleft Lip and Palate: Its Surgical Correction. A. D. Davis, San Francisco.—p. 357.
*Benzol Poisoning: Case. D. S. Pulford, Woodland, Calif.—p. 361.
Clinical Aspects of Carcinoma of Ovary. L. A. Emge, San Francisco.—p. 366.

Bispinous Diameter.—Hanson measured accurately the bispinous diameter in a series of cases. The data obtained show that the persistent occiput posterior position occurs almost invariably in pelves with a narrow bispinous diameter. The inference drawn from this observation is that the narrow bispinous diameter forms a serious obstacle to the cardinal movement of rotation. The practical bearing of this conclusion is the indication for earlier operative intervention when the head is deeply engaged in occiput posterior positions occurring in pelves with a narrow bispinous diameter.

Wounds of Chest.—According to Stephens and Cohn, hemorrhage, alterations in intrapleural pressure, and infection are the main causes of death in penetrating wounds of the chest. The present treatment of hemothorax can be improved, but aspiration with replacement by air or oxygen is a step forward. Alterations in intrapleural pressure can be rectified easily if they are recognized early and the necessary treatment is instituted. In civil practice the late mortality rate is low in penetrating wounds of the chest.

Benzene Poisoning.—Pulford describes a case of acute benzene poisoning in a painter who showed hemorrhage from the gums, marked anemia and leukopenia, which responded rapidly to repeated transfusions. The case emphasizes the necessity of considering this fast-disappearing malady in the differential diagnosis of diseases that are accompanied by marked leukopenia.

Delaware State Medical Journal, Wilmington

3: 179-196 (Oct.) 1931

Science and Medicine. G. C. McElfatrick, Wilmington.—p. 179.
Pertussis: Its Early Diagnosis and Rectal Ether Treatment. W. A. McGee, Richmond.—p. 181.
Clinical Results of Radium Therapy in Wilmington General Hospital. I. Burns, Wilmington.—p. 182.

Florida Medical Association Journal, Jacksonville

18: 207-252 (Nov.) 1931

Present Status of Injection Treatment of Internal Hemorrhoids. L. F. Robinson, Fort Lauderdale.—p. 215.
Newer Knowledge of Nutrition. R. A. Strong, New Orleans.—p. 220.
Bronchial Asthma and Allergic Rhinitis: Review of Literature and Notes on Occurrence in Southern Florida. E. S. Nichol, Miami.—p. 225.
Endoscopy: Aid in Diagnosis and Treatment in Disease of Throat and Thorax. J. W. Taylor, Tampa.—p. 229.
Chronic Endocervicitis. J. A. Powell, West Palm Beach.—p. 232.

Georgia Medical Association Journal, Atlanta

20: 415-456 (Nov.) 1931

Bone and Joint Tuberculosis in Children. T. Toepel, Atlanta.—p. 417.
Management of Menopause. J. W. Landham, Atlanta.—p. 419.
Recent Advances in Prevention and Treatment of Diseases in Children. J. Yampolsky, Atlanta.—p. 423.
Integrating Services of Public Health Agencies and Private Practitioners in Control of Tuberculosis. M. F. Haygood, Alto.—p. 433.

Journal of Bacteriology, Baltimore

22: 309-374 (Nov.) 1931

Filter-Passing Anaerobic Bacteria of Upper Respiratory Tract in Health and During Acute Respiratory Disease. E. L. Burky and H. L. Freese, New York.—p. 309.
Aggressins: Outline of Development of Theory and Notes on Use of These Products. J. P. Scott, Manhattan, Kan.—p. 323.
*Effect of Sodium Ricinoleate on Gonococcus. C. P. Miller, Jr., and Ruth Castles, Chicago.—p. 339.
Study of Bacterial Fluorescence in Various Mediums: I. Inorganic Substances Necessary for Bacterial Fluorescence. F. R. Georgia and C. F. Poe, New York.—p. 349.
Observations on Variants Derived from Two Strains of Streptococcus Hemolyticus. Constance D. Gallagher, New Haven, Conn.—p. 363.

Effect of Sodium Ricinoleate on Gonococcus.—Miller and Castles describe experiments in which they noted that sodium ricinoleate inhibited the growth of gonococci on artificial mediums in very high dilutions. Gonococci suspended in 0.1 and in 1 per cent solutions of sodium ricinoleate were in large part dissolved (as are pneumococci and streptococci). Such suspensions killed mice in smaller doses than suspensions of untreated gonococci. The same result was obtained with gonococci treated for as long as seventy-two hours with sodium ricinoleate. Ricinoleated gonococci inoculated into rabbits engendered specific agglutinating and complement-fixing antibodies in as high titers as did untreated gonococci. The difference between the effect of sodium ricinoleate on the killing power of the gonococcus and on that of the streptococcus and pneumococcus probably depends on the differences in the mechanism of pathogenicity. On the basis of these observations the authors conclude that sodium ricinoleate does not "detoxify" gonococci but rather increases their lethal action for mice. It does not destroy the antigenic properties of gonococci.

Journal of General Physiology, Baltimore

15: 119-256 (Nov. 20) 1931

Stimulation by Hydrochloric Acid in the Catfish, Schilbeodes. W. H. Cole and J. B. Allison, New Brunswick, N. S.—p. 119.
Combination of Standard Gelatin Preparation with Hydrochloric Acid and with Sodium Hydroxide. D. I. Hitchcock, New Haven, Conn. —p. 125.
Photocell Analysis of Light of the Cuban Elaterid Beetle, Pyrophorus. E. N. Harvey, Princeton, N. J.—p. 139.
High Speed Photomicrography of Living Cells Subjected to Supersonic Vibrations. E. N. Harvey and A. L. Loomis, Princeton, N. J.—p. 147.
Studies on Crystalline Urease: IV. "Antitryptic" Property of Crystalline Urease. H. Tauber and I. S. Kleiner, New York.—p. 155.
Sol-Gel Transformation in Gelatin. D. M. Greenberg and M. A. Mackey, Berkeley, Calif.—p. 161.
On Rate of Oxygen Consumption by Fertilized and Unfertilized Eggs: I. Fucus Vesiculosus. D. M. Whitaker, Cambridge, Mass.—p. 167.
Id.: II. Cumingia Tellinoides. D. M. Whitaker, Cambridge, Mass.—p. 183.
Id.: III. Nereis Limbata. D. M. Whitaker, Cambridge, Mass.—p. 191.
Analysis of Geotropic Orientation of Young Rats: Part I. W. J. Crozier and G. Pincus, Cambridge, Mass.—p. 201.
Id.: Part II. W. J. Crozier and G. Pincus, Cambridge, Mass.—p. 225.
Id.: Part III. W. J. Crozier and G. Pincus, Cambridge, Mass.—p. 243.

Journal of Nutrition, Springfield, Ill.

4: 443-548 (Nov.) 1931

Studies on Lactation: I. Production of Milk in Dog as Influenced by Different Kinds of Food Proteins. R. G. Daggs, Rochester, N. Y. —p. 443.
*Value of Oyster in Nutritional Anemia. H. Levine, R. E. Remington and F. B. Culp, Charleston, S. C.—p. 469.
Utilization of Iron of Protein Foods by Albino Rat: (A) Comparison of Growth and Iron Assimilation as Affected by Different Protein Foods; (B) Comparison of Protein Foods Supplementary to Milk as Sources of Iron in Nutrition. R. C. Miller and E. B. Forbes, State College, Pa.—p. 483.
*Effect of Partial Depletion of Vitamin B Complex on Learning Ability in Rats. S. Maurer and Loh Seng Tsai, Chicago.—p. 507.
Effects of Radiant Energy on Milk Anemia in Rats. P. C. Foster, New Orleans.—p. 517.

Value of Oyster in Anemia.—The finding of large amounts of copper in the oyster prompted Levine and his associates to make a study of the influence of the oyster in hemoglobin regeneration in rats rendered anemic on milk. When it was fed daily for a period of eight weeks, 0.56 Gm. of dried oysters (4 Gm. fresh basis) allowed regeneration to the normal hemoglobin level in from two to three weeks, whereas 0.28 Gm. (2 Gm. fresh basis) brought a return to normal in from four to five weeks. Fourteen-hundredths gram (1 Gm. fresh basis) permitted only about 80 per cent blood regeneration at the end of eight weeks. It is estimated that the minimum daily iron requirement of the rat lies between 0.17 and 0.3 mg. A comparison of dried oysters, an acid solution of oyster ash and a solution containing iron, copper and manganese was made at various levels. All three supplements permitted blood regeneration at approximately the same rate, indicating, first, that inorganic elements present in the oyster are responsible for its antianemic potency and, secondly, that the effectiveness of the oyster in nutritional anemia can be accounted for on the basis of its iron, copper and manganese content.

Vitamin B and Learning Ability.—Maurer and Loh Seng Tsai present experimental data which prove conclusively that early partial depletion of vitamin B complex is detrimental to higher nervous function as measured by maze learning ability, but that the offspring of the depleted animals, i. e., those that survive the high infant mortality, can attain the normal level of learning ability provided they are brought up on a diet rich in vitamin B complex.

Med. Bull. of Vet. Adm., Washington, D. C.

7: 1005-1105 (Nov.) 1931

Medical Science in Thirteenth Century. A. M. Rothrock.—p. 1005.
Study of Cancer in Ex-Service Men. P. B. Matz.—p. 1010.
Traumatic Affections of Auditory Nerve. J. H. Baird.—p. 1032.
Malignancy Diagnosticated as Pulmonary Tuberculosis: Four Cases. B. L. Talbot.—p. 1037.
Carcinoma of Lungs. J. Rothman.—p. 1044.
Expectancy of Cancer in World War Veterans. J. M. Ehlert.—p. 1048.
Legal Psychiatry. H. J. Pittock.—p. 1050.
Gastro-Intestinal Lesions in Patients with Diagnoses of Psychoneurosis. A. C. Garton.—p. 1053.
Incidence of Intestinal Parasitic Infection in 719 Filipino Beneficiaries. J. Cabreza.—p. 1060.
Silicosis and Pulmonary Tuberculosis. J. C. Herrick.—p. 1063.
Care and Treatment of Teeth and Oral Cavities in Tuberculous Patients. W. F. Amoit.—p. 1065.

New England Journal of Medicine, Boston

205: 939-986 (Nov. 12) 1931

Dyspnea. J. H. Means, Boston.—p. 939.
Cyanosis and Clubbing of Fingers. T. D. Jones, Boston.—p. 940.
Factor of Bronchial Dyspnea in Heart Disease. S. A. Levine, Boston. —p. 941.
Velocity and Volume of Blood Flow. H. L. Blumgart, Boston.—p. 943.
Tests of Physical Fitness: Physiology of Muscular Exercise. A. V. Bock, Boston.—p. 944.
Functional Tests in Life Insurance Examination. H. M. Frost, Boston. —p. 946.
State-Aided Cancer Clinics as Seen by Practicing Physician. H. L. Lombard and Eleanor J. MacDonald, Boston.—p. 949.
Sporotrichosis in Connecticut: Case. E. C. Weise, Bridgeport, Conn. —p. 951.
Opportunities for Improving Health of Aged in Administration of Massachusetts Old Age Assistance Law. Constance Williams, Winchester, Mass.—p. 955.

205: 987-1030 (Nov. 19) 1931

*Thyroglossal Cysts and Fistulae. H. G. Jarvis, Hartford, Conn.—p. 987.
Cardiology, Old and New. W. H. Robey, Boston.—p. 992.
Cystinuria Complicated by Cystine Calculi: Case. J. B. Hicks, Boston. p. 1001.
Findings of Committee on Growth and Development of White House Conference on Child Health and Protection. H. C. Stuart, Boston. —p. 1004.
*Treatment of Paroxysmal Tachycardia. J. C. Healy, Boston.—p. 1010.

Thyroglossal Cysts and Fistulas.—Jarvis believes that to cure thyroglossal cysts, in most instances, an operation must be done in which the fistula is dissected out from the neck to the foramen caecum. He feels that markedly infected thyroglossal cysts should not be dissected at the first operation through the hyoid bone to the foramen caecum, because of the great danger of the infection running down the mediastinum.

Paroxysmal Tachycardia.—According to Healy, paroxysmal tachycardia is a well recognized and, in a large percentage of cases, a functional cardiac disturbance. A fair number of patients with this condition are perfectly well at the time of consultation, and the diagnosis is made on the history of sudden onset of palpitation and the absence of heart or thyroid disease as determined by roentgenograms, electrocardiograms and basal metabolism rate. Treatment at such times is unsatisfactory and generally limited to instruction of the patient in the art of stimulating his own vagus nerves by pressure. If the patient is seen during an attack, immediate relief is urgent, and two forms of therapy are indicated, mechanical or medicinal, or sometimes both. It is noteworthy, however, that any mechanical attempt to stimulate the vagus often fails, and that the same method is liable to be valueless in a second attack. The operator has the choice of pressure in the supra-orbital region or on the eyeballs, sinus caroticus or abdomen, or of having the patient sip cold water and attempt expiration at the same time. Czermak's maneuver, massage from above downward along the medial border of the sternocleidomastoid muscle with deeper pressure as the jugular notch is approached, may be successful. The second, or medicinal, form of therapy involves a variety of drugs, some being empiric, others having fairly well understood modes of action. Digitalis and quinidine sulphate, by their action on the normal and on the abnormal conduction system, seem to be the most indicated and popular drugs. The former has been used successfully, not only in acute attacks but also to prevent recurrences.

Northwest Medicine, Seattle

30: 483-524 (Nov.) 1931

Acute Thrombotic Occlusion of Coronary Arteries. C. R. Austrian, Baltimore.—p. 483.
Practical Consideration of Surgical Dyspepsias. W. H. Bueermann, Portland, Ore.—p. 492.
*Sarcoma of Alimentary Tract: Pathologic and Statistical Study. L. L. Nunn, Vancouver, Wash.—p. 497.
Comedo Adenocarcinoma of Breast: Report of Case of Girl Nineteen Years of Age. F. C. Hill, Omaha.—p. 502.
Field of Thoracic Surgery. O. S. Proctor, Seattle.—p. 503.
Diagnosis and Treatment of Myxedema. C. C. Sturgis, Ann Arbor, Mich.—p. 508.
Rocky Mountain Spotted Fever. E. E. Maxey, Aberdeen, Wash.—p. 512.
Spinal Anesthesia Record Sheet. L. H. Maxson, Seattle.—p. 517.

Sarcoma of Alimentary Tract.—Of seventy-two patients who had sarcoma of the alimentary canal, sixty-five have been definitely traced by Nunn. Of these, forty-nine are dead and sixteen are living and well. The stomach was involved in thirty-seven cases, more than any other organ. There were

no cases of primary sarcoma of the appendix. Fifty of the growths were lymphosarcoma, which constitute the predominant type of sarcoma in all portions of the alimentary tract, with the exception of the rectum. The fifth decade of life was the decade of the greatest incidence. The most prominent symptom of sarcoma of the small bowel was pain at the site of the growth, accompanied by intermittent attacks of partial obstruction.

Philippine Journal of Science, Manila

46: 305-536 (Nov.) 1931. Partial Index

Avian Malaria Studies: I. Prophylactic Plasmochin in Inoculated Avian Malaria. P. F. Russell.—p. 305.
Id.: II. Prophylactic Plasmochin Versus Prophylactic Quinine in Inoculated Avian Malaria. P. F. Russell.—p. 347.
Malaria Transmission in Philippines: V. Maturation of Ova of Anopheles Funestus Giles. C. Manalang.—p. 363.
*Id.: VI. Dark-Night Factor. C. Manalang.—p. 371.
Causes of Irritation on Injection of Iodized Ethyl Esters of Hydnocarpus-Group Oils. H. I. Cole.—p. 377.

Malaria Transmission.—Data collected by Manalang during thirteen months of study of natural malaria infection of Anopheles funestus in South Portal camp of the Novaliches water project show that at least 87 per cent of those who contracted malaria were infected during the dark nights. Malaria transmission in the locality observed was at least four times more frequent during the dark than during the bright nights, and the chance of contracting the disease was eighty times out of a hundred during the dark nights.

Physical Therapeutics, Elmira, N. Y.

49: 405-444 (Nov.) 1931

Physical Measures Useful in Disabilities and Painful Conditions of Shoulders and Arms. F. deKraft, New York.—p. 405.
Radiotherapy. O. T. Cruikshank, Pittsburgh.—p. 411.
Ultrashort Waves in Medicine. E. Schliephake, Jena, Germany.—p. 415.
Human Beings as Antennas. E. Schliephake, Jena, Germany.—p. 418.
*Radiation Therapy of Radiculitis. L. A. Hadley, Syracuse, N. Y.—p. 423.

Radiation Therapy of Radiculitis.—According to Hadley, radiculitis, usually associated with spondylitis, is characterized by pain in those peripheral areas supplied by the corresponding nerve roots, is aggravated by coughing, sneezing or twisting the back, and reveals tenderness to deep pressure along the spine. This condition is frequently relieved by fractional doses of roentgen rays applied to the nerve roots. The treatment may well be supplemented by diathermy, rest and support. Factors apparently limiting the effectiveness of the treatment are advanced arthritis, anemia and continued toxic absorption. There is no contraindication to radiation therapy if a small dosage is used.

Public Health Reports, Washington, D. C.

46: 2709-2773 (Nov. 13) 1931

*Movements of Epidemic Meningitis, 1915-1930. A. W. Hedrich.—p. 2709.

Movements of Epidemic Meningitis.—Hedrich reviews some of the general epidemiologic characteristics of epidemic meningitis, and the recent movements of the disease as to time and place. The available evidence indicates that, during epidemics, surprisingly large proportions of the population may at one time or another become infected with the meningococcus. Under highly congested conditions, as in army camps, it appears that practically the entire population may become infected once or oftener during epidemics. Probably far less than 1 per cent of such infections result in clinical attack, as annual attack rates in excess of one for each thousand of population are rare. The mortality rate, however, is heavy; in approximately half of the cases reported during the recent epidemic, the patients died in spite of fairly widespread use of serum. Meningitis became increasingly prevalent in Europe shortly after the opening of the World War, and in the United States shortly after her entry, when mobilization began. The highest attack rates in England came in 1915, and in the United States in 1918. In 1928-1930, the disease was again epidemic in most parts of the world. The interval between the last two epidemic maxima was eleven years in the United States and a few years longer in most European countries. The interepidemic interval is highly variable. It has oftenest been from six to twelve years, but some areas have run as long as twenty-five years without epidemics. Massachusetts, for example, has had no appreciable epidemic since about 1905, and New York City only a minor one; namely, in 1928-1930. Over broad areas, such as large groups of states, epidemics have appeared, not as sporadic explosions but as crests of rather smooth and systematic waves, the rising and declining phases of which have covered a period of three to six years or longer. Within smaller areas, such as individual cities, the movements of the disease have been less systematic. Neither of the last two epidemics was synchronous in different parts of the United States, some regions having lagged two years behind others. The time rate of epidemic development within specific areas, and the rate of geographic movement are much slower for meningitis than for influenza. In the 1918 epidemic the reported attack rates were highest in the southern sections, probably because of the large number of military concentration camps; the Rocky Mountain states had the lowest rates. In the 1928 outbreak the Southern states had the lowest and the Rocky Mountain states the highest rates.

West Virginia Medical Journal, Charleston

27: 481-528 (Nov.) 1931

Pylorospasm in Infants. R. C. Bond, Wheeling.—p. 481.
*Advantages of Kielland Forceps. J. R. Bloss, Huntington.—p. 489.
*Management of Pelvic Infections. R. K. Buford, Charleston.—p. 498.
Adventures in Case Finding. H. D. Chadwick, Detroit.—p. 503.
Atrophic Rhinitis and Ozena: Especial Reference to Operative Treatment. W. W. Spelsburg, Clarksburg.—p. 507.

Advantages of Kielland Forceps.—Bloss considers that there are certain absolute essentials to the success of the Kielland forceps. First, it is absolutely essential that a correct diagnosis of the position of the baby's head in the pelvis be made. Second, one must determine which branch of the forceps will be the first introduced. Third, the anterior blade must be introduced first. Fourth, this anterior blade must be rotated according to a definite rule. Fifth, the second blade to be introduced is always the posterior blade. After a somewhat extended experience with the use of this particular type of forceps during the past five years, the author has found it to be the most satisfactory one of any because of the ease with which it may be applied and the accuracy with which it fits the head of the baby, and because of its being less likely to injure the maternal soft parts.

Management of Pelvic Infections.—According to Buford, the successful management and end-results of pelvic infections that require surgical intervention for their complications or sequelae depend on the preoperative studies, which include the careful taking of history, physical examination, appropriate laboratory tests, and efforts to determine the possible cause of the pelvic infection. When leukorrhea is present, smears are taken from the urethra, vagina and cervix. Routine complete blood counts, sedimentation time tests and catheterized urinalyses are made. Patients with hemoglobin less than 65 per cent and a red cell count below 3,500,000 are given a blood transfusion. When the gums are red and spongy, and pyorrhea is present, operation is postponed; in cases of coryza, cough or hoarseness, operation is performed only as an emergency procedure, and then only under spinal anesthesia. After the operation, the wound is left undisturbed for eight days. If a small gutta-percha drain has been placed beneath the fat, it is removed on the fifth day. The bladder is kept empty by an indwelling catheter for three days if a perineorrhaphy or a hysterectomy is done. The use of methenamine and acid sodium phosphate is begun promptly. In cases with persistent vomiting, autolavage, gastric lavage and the duodenal tube are used early. Enemas and colonic irrigations are used freely, but cathartics are never given before or after operation. Soon after the operation, all patients are encouraged to move their arms and legs and change their positions at frequent intervals to prevent embolism. Deep-breathing exercises are practiced to ventilate the base of the lungs and prevent hypostatic congestion. Patients subjected to anesthesia for more than an hour, or those who show signs of impending shock, are given 1,000 cc. of a 5 per cent solution of dextrose by intravenous injection. This is repeated every six or eight hours as long as there is any evidence of dehydration and acidosis.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British J. of Dermatology & Syphilis, London

43: 553-616 (Nov.) 1931

Biotropism (Milian). J. H. Sequeira.—p. 553.
Possibilities of Bismuth Therapy in Treatment of Cutaneous Diseases. M. B. MacKenna.—p. 565.
New Method of Inoculation to Prove Infectivity of Semen in Latent Syphilis. G. Kertséz.—p. 588.

British Medical Journal, London

2: 833-878 (Nov. 7) 1931

*Chronic Epidemic Encephalitis, with Especial Reference to Ocular Attacks. A. J. Hall.—p. 833.
*Acute Spontaneous Hypoglycemia. H. Moore, W. R. O'Farrell, L. K. Malley and M. A. Moriarty.—p. 837.
Transplantation of Bone. W. E. Gallie.—p. 840.
Abdominal Manifestations in Rheumatism. K. H. Tallerman.—p. 844.
Onychia as Occupational Disease. H. Haldin-Davis.—p. 845.
New Method for Injection of Lipiodol. E. Fletcher.—p. 846.
Simple Technic for Introducing Lipiodol into Lungs. P. Franklin and A. Orley.—p. 847.

Chronic Epidemic Encephalitis.—According to Hall, some parkinsonians complain of lethargy, and others of insomnia. Some have narcoleptic attacks. Besides these there are other phenomena occurring in the chronic stage which may possibly belong to disorders of sleep. These are the peculiar periodic "attacks," usually involving the musculature of the eyes or jaws, the upper trunk and limbs, or the respiratory mechanism. The most common of these periodic attacks are the so-called oculogyric crises or ocular-fixation attacks. Out of 384 postencephalitic parkinsonians of whom the author has personal records, 60 (about 15 per cent) have these attacks, while in another 5 per cent there are closely related ocular attacks, differing slightly in certain details. The two sexes are equally affected. Most of the patients are young people. The onset may be sudden. The eyes are usually described as "suddenly shooting up into the head." In many cases, however, there is a definite warning, which may be longer or shorter, and may take various forms. As a rule, the eyes turn up. In some this is associated with slight lateral deviation, in others it is not. In a few, however, a downward movement may occur at the first or may alternate with the upward movement. Much more rarely the movements may be entirely lateral, without any up or down element. The result is the same whatever the direction. The eyes become fixed there and cannot be got back into their proper position. At the onset an attack can, at times, be made to pass off. Sometimes this can be done by the patient. Thus, during the onset the eyes can be brought down voluntarily for a few seconds, but they go up again. Sometimes they can be made to stay down. Strong suggestion may also cause an attack to pass off. An attack may also be cut short by strong external stimuli of various kinds. Thus, in one case, forcibly pushing the head backward ended an attack. Its repetition in other attacks was, however, without effect. Their frequency and duration vary widely in different cases, and at different periods in the same case. They may occur at more or less regular intervals, or quite irregularly. There may be two or three a day, or perhaps only one every few weeks. In some cases they usually occur about the same time of day, in others they do not. They are much more common in the afternoon than earlier in the day. They may last only a few minutes or several hours, during which time the patient is helpless. In most cases the attack ends in sleep, and the patient wakes quite free from the seizure; at other times the attacks cease spontaneously; it is only in a few cases that they never end in sleep. Various circumstances will precipitate an attack, such as prolonged use of the eyes in reading, going to the cinema, and so on. Emotional excitement of any kind, or even suggestion, may be the starting point. Certain associated conditions may accompany the attack. The head may be retracted or turned down or to one side. There may be general restlessness and mental distress, or dizziness, with flushing of the face and diplopia. Existing tremor may be increased. There may be an associated opening of the mouth. In some cases there is a certain amount of pain in the head. As a rule, pain is absent. All the cases which the author has seen are definitely parkinsonian, but sometimes only slightly so; indeed, in quite a number of cases the patients would be able to carry on their work if it were not for these attacks. So far, in none of his cases have the attacks ceased permanently.

Acute Spontaneous Hypoglycemia.—Moore and his associates report a case of acute spontaneous hypoglycemia with severe symptoms. There was also chronic hypoglycemia, and there was associated transient achlorhydria and faulty amylaceous digestion. The severe acute symptoms were promptly relieved by the intravenous injection of 10 Gm. of dextrose.

Glasgow Medical Journal

35: 257-320 (Nov.) 1931

Rickets: Osteotomy and Cesarean Section in Glasgow, 1877-1930. A. K. Chalmers.—p. 257.
Some Aspects of Mental Hygiene. D. Yellowlees.—p. 267.

Journal of Tropical Medicine & Hygiene, London

34: 353-368 (Nov. 2) 1931

Blood Grouping of Central Australian Aborigines: 1930 Series. J. B. Cleland.—p. 353.
Some Cases of Intestinal Infection Due to Castellani's Metadysentery Bacilli. M. Peruzzi.—p. 358.
Some Aspects of Colon Group of Organisms, with Especial Reference to Water Supplies of Trinidad. J. L. Pawan.—p. 360.
Minor Tropical Diseases. A. Castellani.—p. 364.

Lancet, London

2: 945-998 (Oct. 31) 1931

Surgery of Diffuse Splenomegalies. A. J. Walton.—p. 945.
*Albuminuria of Pregnancy. G. W. Theobald.—p. 948.
Pulmonary Asbestosis Complicated by Pulmonary Tuberculosis. W. B. Wood and S. R. Gloyne.—p. 954.
*Direct Laryngoscopy and Aspiration in Laryngeal Diphtheria. W. T. Benson.—p. 956.

Albuminuria of Pregnancy.—On the basis of experiments that he performed on dogs, Theobald suggests that the albuminuria associated with pregnancy could be accounted for by mechanical means, chief of which are the lordosis, the diminished thoracic capacity associated with the latter months of pregnancy, and the weight of the uterus. It is certainly of interest that the addition of acetic acid to the cold urine of these patients frequently causes a definite precipitate. The lordosis alters the diameter of the inferior vena cava and affects the flow of blood. A full stomach and a loaded colon may press on the inferior vena cava and be pressed on by the uterus when the woman lies in the recumbent position. The actual onset of the albuminuria is probably determined by the diet. It cannot be too strongly emphasized that in about 20 per cent of the cases of eclampsia the convulsions occur shortly after the urine is known to be free from albumin. Indeed, the patient may recover from the disease without ever passing an albuminous urine. Conversely, with suitable treatment, the albumin may almost disappear from the urine of a patient, but eclampsia may nevertheless develop. Moreover, sections made from the kidneys of patients who die from eclampsia or from accidental hemorrhage only infrequently show the changes associated with either acute or chronic nephritis. It is surely illogical to postulate changes, in the kidneys of patients who recover, that are not discovered in the presumably more serious cases in which the patients die, particularly when it is found impossible to demonstrate their presence by any known tests. Congestion of the kidneys, however, renders them permeable to albumin and more prone to nephritic changes. If the author's view is correct, albuminuria, alone, bears no relationship to the toxemias of pregnancy, except that disturbances of the metabolism and diet are factors in the causation of both. Albuminuria is an important symptom but is of serious concern only when associated with a high or an increasing blood pressure. An increasing blood pressure is of grave significance even when no albumin is present in the urine, and it is a matter of real concern that the sphygmomanometer does not always form part of the equipment of an antenatal clinic. The suggestion is made that Walcher's position and the ingestion of the whites of eight eggs in 25 cc. of alcohol on an empty stomach are two tests which might be of value in testing the permeability of the kidneys of those women who have albuminuria when pregnant but whose kidneys at other times are normal, as judged by the usual kidney function tests.

Direct Laryngoscopy in Diphtheria.—Benson is of the opinion that when symptoms of croup are suspected to be due to diphtheritic infection the laryngoscope, supplemented by bacteriologic examination of the larynx, affords the most accurate method of diagnosis. In severe diphtheritic infection, inspection of the larynx will indicate the best method of relieving the respiratory distress. Aspiration is indicated when dyspnea is due to extensive membrane formation. When gross subglottic edema is the cause of the respiratory difficulty, operative measures are necessary. Fewer patients with laryngeal diphtheria require operation if aspiration is judiciously employed. Direct laryngoscopy permits the introduction of an intubation tube by visual guidance, thus diminishing the risk of trauma associated with the indirect method of intubation. The author emphasizes the fact that while as yet satisfactory statistical evidence is lacking, one needs only to witness the dramatic relief following suction in certain cases of severe laryngeal diphtheria to form the opinion that this method of treatment is worthy of serious consideration.

2: 999-1056 (Nov. 7) 1931

Medical and Psychologic Aspects of Gynecology. J. S. Fairbairn.—p. 999.
Surgery of Diffuse Splenomegalies. A. J. Walton.—p. 1004.
*Alkaline Treatment of Chronic Nephritis. D. M. Lyon, D. M. Dunlop and C. P. Stewart.—p. 1009.
*Radium by Mouth or Injection in Treatment of High Blood Pressure. N. Mutch.—p. 1013.
Massive Collapse of Lung: With Notes on Posttraumatic Case. T. E. Gumpert and D. MacLennan.—p. 1017.
Hereditary Aspects of Leber's Optic Atrophy. W. R. Russell.—p. 1018.
Chemical Nature of Pellagra Toxin and Thiosulphate Treatment of Pellagra. I. Sabry.—p. 1020.

Alkali Treatment of Chronic Nephritis.—Lyon and his associates studied a series of seventeen cases of chronic nephritis, the reactions to certain types of diet and to alkalis being observed. They noted that a basic type of diet is better tolerated by such patients than an acidic type. The deleterious effect of an acidic diet may be counteracted by the simple administration of adequate doses of alkali. In advanced cases, at any rate, it is usually necessary to supplement even a basic diet with alkali salts in order to maintain an alkaline urine. The beneficial effect of the basic diet seems to be due entirely to its alkalinity. The alkalinity does not act by reducing the absorption of protein or by decreasing the rate of breakdown of the body proteins.

Radium in High Blood Pressure.—Mutch believes that radium by mouth or injection in the treatment of high blood pressure is a method of great utility and easy to apply. The only difficulties encountered have been due to reactions at inflammatory foci. These were particularly common in chronic arthritis and fibrositis, and at the time were a hindrance, although at a later date they appeared to be followed by a corresponding phase of improvement. Pain reactions also occur in thrombo-angiitis obliterans and correspond with a temporary aggravation in the symptoms of partial occlusion. If such a condition is suspected, even in a larval form, great caution should be used in the early stages of radium therapy. Finally, it would be unwise to neglect other general schemes of treatment based on what appears, after careful clinical examination, to be the pathogenesis of each particular patient's syndrome. It is especially important to rid him of sepsis and to cleanse the alimentary tract by simplifying the diet, aiding digestion, speeding up evacuation and protecting him with adsorbents from the effects of toxic substances produced in the bowel. If general treatment of this kind is instituted in the first place and kept up in a modified way afterward, the patient will be put in the best position to reap the fullest benefits from the additional reduction in pressure secured by radium therapy.

Medical Journal of Australia, Sydney

2: 437-468 (Oct. 10) 1931

Lister's Early Bacteriologic Researches and Origin of His Antiseptic System. C. Martin.—p. 437.
Chronic Tonsillitis and Its Surgical Treatment. R. G. Brown.—p. 444.

South Africa M. Assn. Journal, Cape Town

5: 657-692 (Oct. 24) 1931

Diagnosis and Treatment of Acute Appendicitis. A. W. Sanders.—p. 659.
Organization of Medical Congresses. J. J. Levin.—p. 669.

Japanese Journal of Gastroenterology, Kyoto

3: 175-280 (Oct.) 1931

*Quantity of Lactic Acid in Blood, Bile and Urine During Disturbance of Hepatic Functions: Report I. Quantity of Lactic Acid in Blood of Patients with Liver Diseases. H. Mizuno.—p. 175.
*Id.: Report II. Quantity of Lactic Acid in Blood in Experimental Disturbance of Hepatic Functions. H. Mizuno.—p. 184.
Experimental Investigation on Fate of Bilirubin Introduced into Blood Vessels: Report V. Change of Bilirubin Concentration in Blood Vessels, When Bile Duct is Ligated (Responsibility of Gallbladder for Appearance of Jaundice). S. Saiki.—p. 192.
Id.: Report VI. Transmission of Bilirubin into Spinal Fluid from Blood Vessels. S. Saiki.—p. 195.
Id.: Report VII. Excretion of Bilirubin from Kidneys. S. Saiki.—p. 197.
*Id.: Report VIII. Relationship Between Liver and Kidneys with Regard to Excretion of Bilirubin. S. Saiki.—p. 202.
Clinical and Experimental Studies on Urobilin Bodies: Report VI. Significance of Blood Pigment in Metabolism of Urobilin Bodies. M. Oshima.—p. 207.
*Experimental Studies on Gastric Secretion: Report I. Influence of Acids and Bases on Gastric Secretion. Y. Maruno.—p. 210.
Id.: Report II. Influence of Poisoning and Electric Excitation of Vegetative Nerve System on Gastric Secretion. Y. Maruno.—p. 220.
Id.: Report III. Process of Intragastric Appearance of Pigments Introduced into Blood. Y. Maruno.—p. 226.
Id. Report IV. Gastric Secretion from Point of View of Amount of Chlorine in Gastric Juice. Y. Maruno.—p. 241.
Significance of Liver Glycogen in Liver Function: Report III, Part II. Glucose Test in Cases Where Liver Glycogen is Increased. I. Ikushima.—p. 250.
Id.: Report IV, Part I. Levulose Test in Cases Where Liver Glycogen is Diminished. T. Ikushima.—p. 253.
Id.: Report IV, Part II. Levulose Test in Cases Where Liver Glycogen is Increased. T. Ikushima.—p. 257.
Id.: Report V, Part I. Suprarenin-Hyperglycemia in Cases Where Liver Glycogen is Diminished. T. Ikushima.—p. 260.
Id.: Report V, Part II. Suprarenin-Hyperglycemia in Cases Where Liver Glycogen is Increased. T. Ikushima.—p. 263.

Lactic Acid in Blood, Bile and Urine During Hepatic Disturbance.—According to Mizuno, the quantity of lactic acid in the blood of healthy persons lies between 5.5 and 8.5 mg. per hundred cubic centimeters. In a few cases of catarrhal icterus the quantity of lactic acid in the blood increases evidently and reaches even above double that of healthy persons; such patients have disturbance of the hepatic function, and the prognosis is fatal. In gallstone patients without icterus and hepatic intumescence, the quantity of lactic acid in the blood is normal; in cases of gallstones accompanied by icterus and swelling of the liver it shows a partial increase, and those cases which show an increase take a long course after the appearance of the icterus and hepatic intumescence and show symptoms of disturbance of hepatic function. In all cases of cancer of the liver, acute phosphorus poisoning, liver cirrhosis, Weil's disease, gumma of the liver, liver distomiasis, liver abscess, arsphenamine icterus, and valvular defect in the decompensated heart there is an increase in the lactic acid in the blood, and this increase almost coincides with the grade of the disturbance of the hepatic function. The quantity of lactic acid in the blood of the same patient also varies according to the stadium; that is, in serious stadia an increase is evident, and in recovering stadia it approaches the normal value in according with the grade of recovery. The discrepancy between the results of Adler and of Noah may be caused by difference in the stage of the disease at which they were obtained. From the results obtained with the diseases mentioned, it is probable that the increase of lactic acid in the blood is caused by a disturbance of the cells of the parenchyma of the liver.

Lactic Acid in Blood in Experimental Disturbance of Hepatic Functions.—Mizuno describes experiments in which he noted that the quantity of lactic acid in the blood of a rabbit which is injured by the injection of hepatotoxin is greater than that of a normal rabbit. The quantity of lactic acid in the blood of a rabbit the liver of which has been impaired with phosphorus, chloroform and carbon tetrachloride, increases generally, though it varies in accordance with the dose. The quantity of lactic acid in the blood increases when various cells in the liver are injured by roentgen irradiation and ligature of the ductus choledochus communis or when its function is disturbed by partial excision. When the function of the stellate cells is disturbed by the injection of chinese ink, the quantity of lactic acid in the blood does not differ from the normal. From the results described, the author concludes that it is the

parenchyma cells in the liver that are connected with the lactic acid content in the blood.

Investigation on Fate of Bilirubin.—Saiki describes two series of experiments from which he concludes that the liver assumes the function of the bilirubin excretion of the kidneys in the same way as the kidneys do that of the liver. When the kidneys are entirely shut out of the blood system, injected bilirubin appears more quickly in the bile, though its complete excretion into the bile takes longer than is the case with healthy kidneys functioning normally. The facts that were obtained in the two series of experiments show that the liver and the kidneys have a compensatory function in the excretion of blood bilirubin.

Studies on Gastric Secretion.—Maruno reports that various inorganic and organic acids accelerate the gastric secretion of hydrochloric acid in rabbits. As to the degree of this action, hydrochloric acid ranks first and lactic acid follows. Though the action of other acids is much more feeble, organic acids are in general more powerful than inorganic ones. Various bases inhibit the gastric secretion of hydrochloric acid in rabbits. The action is greatest with sodium bicarbonate and least with sodium hydroxide. The difference in the action of acids and bases on the secretion of hydrochloric acid is not due to the *pn* of the solutions but comes from the action of the whole molecule. The promoting action of acetic and lactic acids on the gastric secretion of ferments is marked. In other acids this is not noticeable. All bases have an inhibitory action.

Archives des Maladies de l'App. Digestif, etc., Paris

21: 897-1016 (Oct.) 1931

Acid-Base Balance According to Urologic and Coprologic Determinations. L. Béthoux and P. Mounier.—p. 897.
*Parathyroid Extract in Treatment of Gastroduodenal Ulcers. M. M. Lévy and Erna Lévy.—p. 916.
*Regional Vaccination Through Port of Entry in Colibacillary Infection. R. Poincloux and H. Arloing.—p. 937.
Intestinal Lambliasis with Hepatic Cirrhosis and Cholecystitis: Three Cases. I. Goia and M. Halitza.—p. 957.

Parathyroid Extract in Treatment of Gastroduodenal Ulcers.—The Lévys report their observations in ten instances of various gastroduodenal ulcers studied over a period of one and one-half years. Treatment failed in four cases and led to partial cure in four. The patient was not ordered to follow any particular diet or to restrain from physical exertion, and no medicament except parathyroid extract was administered. Every day or every other day, parathyroid extract corresponding to 0.1 Gm. of fresh gland per ampule was injected subcutaneously until a series of twelve injections had been given. The authors' conclusions are as follows: Parathyroid extract can be considered an effective aid and an excellent therapeutic adjuvant in the treatment of gastroduodenal ulcers. Because of its rapid action, the patient is usually relieved immediately, the general condition improves and the weight increases. The treatment in certain cases leads to the attenuation or even the suppression of a progressive attack of a gastroduodenal ulcer; in some cases it constitutes a preoperative treatment permitting a surgical intervention reduced to the minimum and performed on a patient under the best conditions. However, even though the parathyroid extract alleviates the condition, brings the hydrochloric value back to normal and effaces the roentgen image of the niche, the authors believe their observations show that it does not check the evolution of the ulcerous condition or cure the ulcers permanently.

Regional Vaccination Through Port of Entry.—Poincloux and Arloing review their observations in fifteen cases of colibacillary infections and conclude as follows: Regional vaccination, helpful in combating gonococcic infection, is also of value in colibacillary infection. It is best to use a good stock vaccine or preferably a well prepared autovaccine of Bacillus coli and inject the vaccine exactly in and under the rectal mucosa, a short and wide rectoscope and a syringe with an adequate prolongation and a fine short needle being used. Regional anticolibacillary vaccination influenced favorably most of the urinary, genital or intestinal manifestations treated by the authors. The authors believe that Bacillus coli plays a greater part in gynecologic infections than is commonly believed (90 times, alone or associated with other organisms, in 230 cases studied by one of them). They believe that constipation is an infectious process that may also be treated through the rectal route by regional anticolibacillary vaccination.

Archives des Maladies du Cœur, etc., Paris

24: 593-656 (Oct.) 1931

*Infarct of Myocardium Causing Ventricular Paroxysmal Tachycardia. L. Gallavardin and R. Froment.—p. 593.
Adams-Stokes Syndrome: Case. E. Géraudel.—p. 605.
Anemia in Bright's Disease. E. Taréjew.—p. 627.

Infarct of Myocardium.—Gallavardin and Froment cite six case histories from the literature and conclude that their observations show that infarcts of the ventricular myocardium often give rise to attacks of ventricular paroxysmal tachycardia. In typical cases these ventricular paroxysms have all the characteristics of Bouveret's disease: sudden appearance in a patient with sinusal rhythm and without any signs of cardiac insufficiency, long duration of the attack, monomorphism of the ventricular electrocardiographic complex demonstrating the existence of a center of abnormal excitation. Similar symptoms often accompany crises of distinct or masked angina pectoris but can also appear as isolated symptoms; in the latter it is a true infarct of the myocardium in the form of ventricular paroxysmal tachycardia. In rare instances, these infarcts with ventricular tachycardia occur in patients already asystolic or give rise to extrasystoles and paroxysms of irregular duration. These facts establish the points of relationship between infarcts with tachycardia and extrasystolic impulses in serious cardiopathies. Quinidine seems the only means to arrest a prolonged ventricular paroxysm.

Presse Médicale, Paris

39: 1645-1668 (Nov. 11) 1931

Auxotherapy. M. Loeper, A. Lemaire and P. Soulié.—p. 1645.
*Carbohydrate-Insulin in Cardiology. L. Rimbaud, A. Balmés and G. Anselme-Martin.—p. 1647.
Tetany Following Extracapsular Thyroidectomy: Thyroid-Parathyroid Transplantation. P. Wilmoth.—p. 1650.

Carbohydrate-Insulin in Cardiology.—Rimbaud and his co-workers found that various sugars, monosaccharides, disaccharides and polysaccharides can be used in treatment if the digestive route is used. The duration of treatment varied from ten to twelve days. A five unit dose of insulin was injected subcutaneously. Sugar, mostly saccharose or ordinary sugar, was injected in 100 cc. and 200 cc. volumes of a 50 per cent solution after a lapse of from ten to fifteen minutes in the first instance and a half hour in the second instance following administration of the insulin. Complete clinical and laboratory examinations were made during the treatment of twenty-one patients. The authors conclude that the carbohydrate-insulin treatment cannot replace but may serve as a complementary measure to the usual indicated therapeutics. This treatment alone or associated is justifiable in nonreactive irreducible asystolic conditions, in dextroventricular insufficiencies with states of asystole and hyposystole and in levoventricular insufficiencies. Carbohydrate-insulin had slight influence in the treatment of Basedow's cardiac insufficiency, in the disturbances in cardiac rhythm and in arterial hypertension, and no influence in acute infectious cardiopathies.

Archivio di Ostetricia e Ginecologia, Naples

18: 573-643 (Oct.) 1931

Need of a Blood Culture in Diagnosis of Certain Doubtful Forms of Tuberculosis of Reproductive Organs. C. Bozzolo.—p. 573.
*Tubal Motility and Direct Action Exerted by Follicular Fluid and Extract of Corpus Luteum. L. Manzi.—p. 591.
*Hereditability of Blood Groups. P. Montilli.—p. 623.
*Diastasis of Pubic Symphysis During Labor of a Spontaneous Birth. B. Sorrentino.—p. 636.

Tubal Motility and Direct Action Exerted by Follicular Fluid.—Manzi experimented in vitro on the action of the follicular fluid and of extracts of corpus luteum on tubal motility. Under the influence of the follicular fluid, he observed an increase of kinetic activity of the tube, manifested by a greater height of the contractions and a more regular rhythm. Under the influence of the extract of corpus luteum, on the other hand, he noted a decline or the almost complete disappearance of this activity. He states also the belief that what he observed experimentally will likely be confirmed in vivo: the

motility of the tube would be reinforced during the follicular phase (maturity and, especially, rupture of the follicles) and would be regulated so as to favor the migration of the ovum, whereas, during the luteinic phase, the motility of the tube would be notably reduced, and likewise the motility of the uterus, to favor the implantation of the ovum. In pregnancy, the motility of the tube is reduced, as opposed to the condition during labor. In both these periods, however, the tube responds to the action of the two ovarian secretions in the same manner as in the experiments.

Hereditability of Blood Groups.—Montilli studied the specific group characteristics as revealed by the blood of 145 persons belonging to 25 different family groups, or clans. The characteristics of groups A and B were "dominant" (Mendel): that is, they were not present in the offspring if they did not exist in one of the parents. The characteristics of group O were, however, "recessive" and may appear in the offspring although they do not appear in the parents. These data may prove to have great value in researches on paternity.

Diastasis of Pubic Symphysis During Labor of a Spontaneous Birth.—Sorrentino reports two cases of diastasis of the pubic symphysis observed as the result of labor in spontaneous twin births. In both cases the pelvis was wide and the fetuses were not carried to term. That diastasis of the pubic symphysis could occur in the absence of any trauma whatever, and independently of any obstetric intervention, is of great significance from the medicolegal point of view. In both cases a twin pregnancy was involved, and the question is raised as to whether that fact has any special significance.

Clinica Medica Italiana, Milan

62: 899-1004 (Oct.) 1931

*Relations Between Water Exchange and Polyuria. G. Pellegrini.—p. 899.
Changes in Limitations of Paravertebral Pulmonary Sounds. G. Picchini.—p. 945.
Traumatic Rupture of Valves of Heart. A. Antonini.—p. 972.

Relations Between Water Exchange and Polyuria.—Pellegrini studied in four cases of diabetes insipidus the changes that occur with regard to hydremia and diuresis, as shown by tests of the water values and of the sodium chloride content. The behavior varied in different cases, and it was found that in three cases the kidney eliminated a very weak concentration of sodium chloride, whereas in another case, under peculiar conditions, the kidney eliminated a normal concentration of sodium chloride. The conception appears plausible therefore that in some cases of diabetes insipidus the capacity of the kidney to furnish a concentrated urine is diminished, while in other cases the water diuresis is increased.

Clinica Pediatrica, Modena

13: 769-852 (Oct.) 1931

*Tuberculous "Hilitis." V. De-Benedetti.—p. 769.
*Acute Anterior Poliomyelitis in Province of Pavia. C. Bajo.—p. 799.
Vaccinia Through Contagion: Case. S. Vanni.—p. 833.

Tuberculous "Hilitis."—De-Benedetti brings out that the syndrome of tuberculous tracheobronchial adenopathy, which for a long time has formed the core of infantile tuberculosis, is made up of inconstant or uncertain stethacoustic and roentgenologic signs. In children a frequent and characteristic sign of tuberculous infection is "hilitis," which presents the most disparate pictures of pulmonary infiltration, which, lying close to the hilus or far from it, in a posterior or anterior plane, are projected in the roentgenogram of the hilus. The author emphasizes the important influence of the parenchymatous lesions on the lymph nodes, in producing the "pseudoglandulohilar" roentgenologic pictures in children. Hilitis, according to the author, enters into the picture of the primary infection of children and is the typical roentgenologic expression. The volume, importance and frequency of these infiltrates, which rapidly develop, retrogress and reappear in tuberculous children, have until recently remained unrecognized. One reason for that has been the prejudiced views in regard to the primary complex. The evolution of this is much different from that described by Ranke and embraces a number of pulmonary manifestations, which have been artificially grouped by Ranke into a so-called second phase of tuberculous development. The hilar lesions, which are to a small extent glandular and to a greater extent pulmonary, are located often in pulmonary regions not belonging to the hilus, and belong to a frankly active period of tuberculous infection in the child, and constitute the most interesting roentgenologic manifestation of such infection. Thirteen illustrations give clinical examples of the principles described.

Acute Anterior Poliomyelitis in Province of Pavia.—Bajo reports that in the province of Pavia nine cases of acute anterior poliomyelitis were reported in 1927, six cases in 1928, and fifty-two cases in 1929. The diffusion of the infection in 1929 assumed an epidemic character, closely associated, as to time and lines of communication, with the epidemic occurring in Liguria and in the province of Alexandria. In several cases the only discoverable means of communication with other epidemic foci was represented by healthy adult relatives coming from localities affected by the epidemic. The spinal type prevailed. The paralysis affected chiefly the lower limbs (twenty-six cases out of thirty-two). The upper limbs were seldom affected (three cases out of thirty-two were so affected). Flaccid paralysis of the upper and lower limbs of the same side was rare (three cases out of thirty-two). The highest morbidity was observed in July, August and September, with the peak in September. The disease most commonly affected infants during the second six months of life. Males were slightly more frequently affected than females.

Policlinico, Rome

38: 1541-1580 (Oct. 19) 1931. Practical Section

*Research on Malaria Parasite by Enrichment Method. D. Galletti.—p. 1541.
Rat-Bite Fever: Cases. C. Ingaramo.—p. 1545.
— Id. Andrea Biffis.—p. 1549.

Research on Malaria Parasite by Enrichment Method.—Galletti proposes for researches on the blood to discover the malaria parasite a method of enrichment that is based on the centrifugation of the blood itself rendered incoagulable by means of a minute quantity of potassium oxalate. He reports the excellent results secured: increase of the "density" of the parasites in the smears in a proportion ranging around 66:1.

38: 1581-1616 (Oct. 26) 1931. Practical Section

Nitrous Oxide-Oxygen Anesthesia in Abdominal Operations. N. La Gravinese.—p. 1581.
*Septicemia Rapidly Fatal in Child with Status Thymicolymphaticus. A. Berardi.—p. 1587.
Pneumococcal Septicemia with Purpura Hemorrhagica. C. Rossetti.—p. 1589.
One Hundred and Seventy-Seven Motorcyclists Treated in Ospedale Umberto I for Injuries. G. Andreoletti.—p. 1592.
Effects of Insulin Administration on Renal Threshold. M. Bufano.—p. 1595.

Septicemia Rapidly Fatal in Child with Status Thymicolymphaticus.—Berardi describes a case of septicemia rapidly fatal in a child with status thymicolymphaticus. He considers the genesis and gives the necroscopic observations: notable hypertrophy of the thymus (30 Gm.), hyperplasia of the entire lymphopoietic apparatus, acute dilatation of the heart, chronic tumor of the spleen (the condition of which had again become acute), fatty degeneration of the liver, congested kidneys, hypertrophic tonsils, many intraparenchymatous abscesses and chains of streptococci discoverable microscopically and in cultures. The high degree of constitutional lability prevented the development of a defensive immunizing activity toward the streptococcal septicemia, which in a few hours and unexpectedly led to the death of the child.

Prensa Médica Argentina, Buenos Aires

18: 635-684 (Oct. 20) 1931

*Infarction of Intestine Due to Thrombosis of Mesenteric Vessels. T. Castellano and J. Ducach.—p. 635.
Sexual, Anal, Social and Reflex Pathology. G. Zorraquín.—p. 644.
Dermal Edema in Carcinoma of Breast: Case. E. A. Votta.—p. 662.
Therapeutic Effect of Medical Drainage of Bile Ducts. H. A. Zunino.—p. 669.

Infarction of Intestine Due to Thrombosis of Mesenteric Vessels.—Castellano and Ducach state that in patients with a cardiovascular condition that could produce emboli, the sudden appearance of an acute abdominal syndrome characterized by intense abdominal pain, the presence of ascites, the putrid and hemorrhagic nature of which is proved by a paracentesis, and sometimes melena, followed shortly after the onset

by the first symptoms of cardiac collapse, is indicative of intestinal infarction due to thrombosis of the mesenteric vessels. The disease follows a rapid evolution and is complicated by generalized peritonitis and aggravation of the cardiac collapse. Early diagnosis of this grave syndrome is of great importance, since immediate operation is required to save the patient's life. In the rapid preparation of the patient for operation, certain disturbances which are characteristic of the disease, such as the grave disorders of the cardiovascular system and the presence of acidosis, should be kept in mind so that the patient may receive a prompt preoperative treatment, which should include an intravenous injection either of digitalis or of 0.25 mg. of strophanthin, the administration of atropine or epinephrine, and either an intravenous injection of 20 cc. of a hypertonic, 50 per cent solution of dextrose and sodium chloride or the subcutaneous injection of insulin. The author, however, fails to give the exact dose of these drugs for the treatment. Ether anesthesia is well borne by the patients. The clinical studies of two cases and the necropsy observations made in one of the cases are given.

Semana Médica, Buenos Aires

38: 1029-1108 (Oct. 1) 1931. Partial Index

Intra-Abdominal Hemorrhage of Ovarian Origin: Case. D. A. Rojas and P. A. Landa.—p. 1037.
Emergency Surgery in Trauma of Bladder. J. Salleras.—p. 1040.
Postpartum Necrosis of Posterior Third of Urethra; New Insertion of Posterior End of Urethra: Case. R. Schwarcz.—p. 1047.
Traumatic Paraplegia from Fracture of Dorsal Vertebra; Orthopedic Treatment of Late Sequelae; Case. L. O. Zeno.—p. 1049.
Physiopathology of Pulmonary Circulation in Mitral Stenosis. R. Naveiro. —p. 1056.
*Quantitative Determination of Iodine in Urine by Means of Roentgen Rays. S. Codino.—p. 1074.

Quantitative Determination of Iodine in Urine by Means of Roentgen Rays.—Codino describes a method for the quantitative determination of iodine in the urine. The method is based on the following principles: 1. Two samples of normal urine of equal specific gravity present equal transparency to the roentgen rays. This is true also of two samples of urine of the same specific gravity having the same content of iodine. 2. Roentgen films of samples having the same specific gravity give the same black hue. The method is described thus: At the base of a wooden cone-shaped apparatus are set one or more test tubes filled only to three fourths of their capacity with the urine which is to be tested, and eight or more test tubes with the same amount of normal urine to which has been added an arbitrary amount of iodine solution (each tube with one more drop than the previous one). The tubes are so placed that the roentgen rays strike directly their open end. A roentgen film is then placed under the tubes. At the point of the cone, an anticathode connected with a roentgen tube is placed and then put in action. Since the anticathode is equidistant from all the tubes, all receive an irradiation of equal intensity. The same degree of transparency of one tube of normal urine plus iodine, and one tube with a specimen of the urine to be tested, proves that the latter have the same content of iodine that (in an arbitrary manner) was added to the former. The roentgen film, after having been developed, gives exactly the same hue for tubes having equal iodine concentration. The lesser or greater transparency of the samples regulates the intensity of the current that traverses them. The method is of value to determine the curve of elimination of iopax. In this case the samples of urine to be tested are examined every ten minutes.

Deutsche Zeitschrift für Chirurgie, Berlin

233: 97-312 (Oct. 2) 1931

*Experiments on Optimal Action of Carbon Dioxide on Normal and Anesthetized Animals. H. J. von Brandis and H. Killian.—p. 97.
*Electrocoagulation and Lymph Vessels: Operative Shock. H. Zschau. —p. 109.
Surgical Treatment of Syphilis of Stomach. E. Domanig.—p. 121.
*Changes in Morphologic Blood Picture in Acute and Chronic Stasis of Intestinal Contents: Intestinal Autointoxication. W. Tönnis and A. Brusis.—p. 133.
Longitudinal Growth of Bones. E. Bergmann.—p. 149.
Osteitis Fibrosa (Recklinghausen): Its Differentiation from Other Diseases of Bones. H. Schupp.—p. 195.
Relations of Acute Hematogenic Osteomyelitis to Post Tonsillitic Pyemia. F. Spath.—p. 239.
*Wedge-Shaped Foci in Head of Femur. E. Bergmann.—p. 252.
Various Cysts of Meniscus of Knee. F. Mandl.—p. 262.
Aspects of Rare Sprains of Foot. V. Skřivánek.—p. 269.
Technic of Extirpation of Portions of Lungs. H. Bürkle-de la Camp. —p. 290.
Treatment of Urethral Stricture in Man. E. Brack.—p. 294.
Blood Chemical and Pharmacodynamic Investigations During Ankylosing Polyarthritis. E. Gold.—p. 298.
Formation of Callus and Incretory Influences. E. Bergmann.—p. 302.
Rare Anomalies and Pathologic Formations on Os Naviculare Pedis. F. Schröder.—p. 306.

Optimal Action of Carbon Dioxide on Normal and Anesthetized Animals.—Von Brandis and Killian point out that carbon dioxide is considered by many as indispensable in counteracting asphyxia during anesthesia. However, the quantities of carbon dioxide mentioned in the literature as producing an optimal stimulation were based on observations on normal, that is, on nonanesthetized animals or human beings. But there were thus far no reports on the optimal concentration during various phases of anesthesia, during which the respiratory center is in an abnormal and irritable condition, and for this reason the authors studied this problem. In summing up their results they state that it is necessary to differentiate between the reaction capacity of the respiratory center in the sense of the sensitivity to stimulants and the susceptibility to injurious influences. The first is reduced under the influence of anesthetics; however, the susceptibility to injurious influences is increased. The optimum of the carbon dioxide action is dependent on the duration of the influence. If the administration is prolonged the action is less optimal. For the practice the authors advise that carbon dioxide mixtures of high concentration should not be administered for longer than thirty seconds. If the carbon dioxide is to be administered for from five to ten minutes, a mixture of 10 per cent concentration can be tried, but in cases of longer duration the mixture should contain only 5 per cent of carbon dioxide. The experiments proved that the use of pure carbon dioxide or of highly concentrated mixtures are unnecessary, for in the regulation of anesthesia and in carbon dioxide therapy the object is not to produce sudden respiratory movements, that is, short phases of hyperventilation with subsequent fatigue, but the aim is rather to amplify the respiration and to produce deep and full breathing, and at the same time avoid overexertion of the patient. If the object is only to exert a strong stimulation, a few breaths of a highly concentrated mixture of carbon dioxide (less than 50 per cent) is permissible.

Electrocoagulation and Lymph Vessels: Operative Wound Shock.—Zschau points out that electrical surgery has the advantage that the operative shock is unusually slight. He thinks that the reduction of the hemorrhage alone cannot explain this phenomenon and assumes that the lessened shock may perhaps be due partly to the fact that in wounds produced by electrical surgery the resorption of products of tissue disintegration is extraordinarily slight. To determine the correctness of this assumption he tested the resorption capacity of wounds of animals by introducing poisons. It was found that the resorption from fresh wounds is unusually great but that coagulation of the wound inhibits resorption. As cause for the inhibition of resorption in coagulated wounds he detected closure of lymph vessels and of the capillaries. The opinion that operative wound shock is largely due to the resorption of the products of tissue disintegration has been given a new support.

Blood Picture in Stasis of Intestinal Contents.—Tönnis and Brusis made their experiments on dogs. The acute stasis of the intestinal contents was produced on the small intestine either by ligation or by dissection with invagination and suturing on both ends. Chronic stasis was produced by forming a blind pouch on the small intestine. After the intestine had been dissected and then invaginated on both ends, the distal portion was drawn upward alongside the proximal portion and then joined with the latter by a wide side-to-side anastomosis, so that on the proximal portion a blind pouch, from 40 to 50 cm. in length, is formed. These blind pouches or culdesacs are filled by the peristalsis, and while fluids are discharged again the solid substances are retained. The dogs with such culdesacs all died after two and one-half or three months. Necropsy revealed that the blind pouches were greatly dilated. In order to determine the changes in the morphologic blood picture the number of erythrocytes, the hemoglobin content, the

number of leukocytes and the proportional numbers of the various elements of the white blood picture were continuously investigated. The blood tests during stasis were preceded by control tests on the influence of anesthesia and of surgical intervention. The influence of acute intestinal stasis, when compared with that of anesthesia or of surgical intervention, showed a relative increase of erythrocytes and a leukocytosis with deviation to the left. Chronic stasis of the intestinal contents in the jejunum led to severe anemia. The loss of erythrocytes was on the average 2.7 millions; the hemoglobin content decreased 44 per cent and the color index rose above 1. In the liver and spleen, large deposists of hemosiderin were found. Since hemorrhage could not be detected, the anemia could only have been the result of increased decomposition of the blood. Regeneration forms could not be found in the blood, so that it may be assumed that the erythropoiesis was likewise impaired. In most experiments there also was a leukocytosis with neutrophilic deviation to the left. All dogs with culdesacs of the jejunum became emaciated in spite of an undiminished appetite and of regular defecation, and they died after sixty-four days. Control tests with jejunal culdesacs without stasis of intestinal contents revealed no changes for periods of from 116 to 150 days. In three dogs it was possible to counteract the anemia by extirpation of the culdesac, which proves the relationship between anemia and the chronic stasis of the intestinal contents. Experiments with chronic stasis of the intestinal contents in the ileum produced anemia only once. This animal lived 141 days. Three other dogs subjected to the same experiment revealed no changes in the morphologic blood picture. This shows that there is a surprising difference, in the influence on the blood, of high and low stasis in the small intestine.

Wedge Shaped Foci in Head of Femur. — Bergmann observed that in diseases of the joints, of diverse etiology and of unequal clinical significance, the pathologico-anatomic processes take a similar course. He noted wedge shaped foci in the head of the femur in tuberculous and acute inflammation of the bones, in arthritis deformans and in osteochondritis dissecans. In the course of these diseases a circumscribed wedge shaped section of the head of the femur becomes necrotic, evidently as the result of a partial exclusion of the nutrition (closure of an artery). The differentiation in the further course of the pathologico-anatomic processes becomes manifest mainly in the intensity of the demarcation process. In acute inflammation of the bones, the sequestration is rapid and violent. In tuberculosis, sequestration is usually incomplete. The aseptic necroses rarely lead to demarcation; occasionally, however, especially after traumatic influences, the aseptic wedge shaped focus is cast off and becomes a joint mouse.

Medizinische Klinik, Berlin

27: 1555-1592 (Oct. 23) 1931

Circulatory Processes in Pulmonary Embolism. E. Mosler.—p. 1555.
Tonoscillography and Blood Pressure Curve. J. Plesch.—p. 1557.
*Clinical and Experimental Observations in Lymphogranuloma Inguinale. A. Buschke, A. Boas and von Vàsàrhelyi.—p. 1562.
*Alkali Therapy of Acute Cystitis. T. Hryntschak.—p. 1565.
Roentgen Diagnosis of Fibrous Pericarditis. E. Zdansky.—p. 1567.
Congenital Defect of Right Lung Complicated by Pneumothorax of Right Side: Case. M. Bönniger.—p. 1568.
Studies on Syphilitic Rabbits on Influence of Exclusion of Spleen on Antisyphilitic Efficacy of Arsphenamine. W. Frei and H. Fröhlich.—p. 1571.
Eye Diseases and Heredity. K. Vogelsang.—p. 1573.
Therapy of Whooping Cough. Thessa Ortweiler.—p. 1575.
Addison's Disease Due to War Injury: Case. H. Engel.—p. 1576.

Observations in Lymphogranuloma Inguinale.—Buschke and his associates think that the greater incidence of lymphogranuloma inguinale that has been observed in recent years cannot be explained entirely by the better diagnostic methods that permit a more definite diagnosis, but they think that the disease has actually increased. They call attention to two other papers which they published on this subject, one of which was based on the observation of thirteen cases and the other on the study of thirty-three cases. Since then they have observed twenty-six additional cases, so that in all they studied a material of seventy-two cases. In many respects their observations corroborated those of others, but they also noted certain peculiarities. They consider lymphogranuloma inguinale as an infectious disease of venereal character. And even if the primary lesions are no longer detectable by the time the lymph nodes have become involved, they maintain that the port of entry is in most cases on the genitalia. In cases that come under clinical observation during a comparatively early stage, changes that doubtless are the primary lesions are often noticeable; namely, ulcerations, erosions or herpetiform efflorescences. Sometimes they heal and occasionally relapses occur, but usually there are neither indurations nor suppurations. However, in some instances the primary lesions are erosive and ulcerative, cause indurations and lymphangitic infiltrations, and persist for long periods. In cases with indurations a complication with syphilis was considered possible and in a patient with gangrenous changes a mixed infection with gangrenous ulcer was thought of. However, these assumptions could be corroborated neither by serologic nor by bacteriologic tests. The authors describe the clinical history of two patients. One is noteworthy because the primary lesion developed on the tongue following a cunnilingus, and subsequently the lymph nodes of the neck became involved. The second case history given concerns a patient with rheumatic manifestations and with exanthematic reactions. The authors further describe experimental studies on guinea-pigs, and in the last part of the article they discuss the therapy of lymphogranuloma inguinale. They regret that a causal therapy has as yet not been found and that the treatment is more or less symptomatic, but they stress the necessity of individualization in determining the therapeutic measures. If only the lymph nodes on the surface are involved, puncture and aspiration of the pus is sufficient, for these lymph nodes usually heal rapidly. However, when the deeper lymph nodes are involved, surgical removal is advisable.

Alkali Therapy of Acute Cystitis.—Hyrntschak directs attention to the alkali therapy which Blum as early as 1914 recommended for purpura of the bladder. The alkali therapy is carried out in that the patients are put on an alkaline diet; i. e., the protein intake (meat, eggs, cheese) is limited, and fresh vegetables and fruits are given instead, in large quantities. Fluids in the form of milk, alkaline mineral waters and fruit juices are taken in large amounts. Medicinal treatment provides for the administration of sodium bicarbonate, or of other alkalization-producing medicaments, three times daily. The alkali therapy effects a rapid subjective and objective improvement and also cure, not only in vesical purpura, for which it was first prescribed, but also in the various forms of acute cystitis, such as cystitis ulcerosa, cystopyelitis, acute pyelocystitis and urethrocystitis; even in tuberculous cystitis, alkali treatment is helpful. However, chronic forms of cystitis yield less readily to alkali therapy. The favorable results of alkali therapy are due to the fact that the acidity, existing in every inflammation, is counteracted. Experimental studies on the influence of the reaction of the urine on the healing tendencies of ulcers of the bladder in rabbits corroborated this.

Münchener medizinische Wochenschrift, Munich

78: 1853-1894 (Oct. 30) 1931

Estimation of Capillaroscopy on Skin Surrounding Nail. F. Jamin.—p. 1853.
Treatment of Disordered Carbohydrate Digestion with an Enzyme Preparation that Decomposes Cellulose and Hemicellulose. A. E. Lampé and A. Schmidt-Ott.—p. 1855.
Experiences with Enzyme Preparation in Roentgenology. G. A. Weltz.—p. 1860.
*Etiology and Therapy of Nitritoid Crisis and of Arsphenamine Dermatitis. W. Milbradt.—p. 1860.
*New Treatment of Muscular Pain. R. Trumpp.—p. 1862.
Pararticular Hemorrhage and Hemorrhage into Joint Cavity: Treatment with Partial Fixation. K. Gebhardt.—p. 1864.
Anatomic Sequelae of Reflex Angiospasms. R. Beneke.—p. 1869.
Progress in Recognition and Treatment of Most Important Forms of Poisoning. E. Leschke.—p. 1872.
Evaluation of Medicinal Carbon. E. Leschke.—p. 1874.

Etiology and Therapy of Nitritoid Crisis and of Arsphenamine Dermatitis. — Milbradt points out that nitritoid crisis is considered by many investigators as the result of changes in the colloid structure of the serum. His own studies, however, did not corroborate this theory. Comparison of serum stability with toxicity in mice showed no parallelism. He does not deny an influence of arsphenamine on the colloidal structure, but he rejects the theory that these changes are the only or the primary cause of the arsphenamine shock. As the etio-

logic factor of arsphenamine dermatitis, an impairment of the function of the liver is generally assumed, but the final proof for this hypothesis could not be brought until the functional tests of the liver had become more perfected. The author calls attention to these tests and then reports his own investigations on the relation between impairment of the function of the liver and arsphenamine dermatitis. As the factors that indicate a connection between the two, he cites (1) demonstration of injury of the liver during arsphenamine dermatitis by means of Althausen's test and (2) prompt cure of the dermatitis by means of a liver preparation. This preparation stimulates the impaired hepatic function, cures chronic arsphenamine intoxication and has a prophylactic as well as a therapeutic influence on the manifestations of arsphenamine sensitization.

New Treatment of Muscular Pain.—In the introduction, Trumpp stresses the necessity of differentiating true myalgia from neuralgia, arthritis, functional neuroses and neurasthenia, and expresses regret that many general practitioners are not sufficiently informed about pathologic changes in the muscles, in spite of the fact that several investigators have studied "muscular indurations." The latter authors consider the muscular changes of a colloidal-chemical nature, which lead to formation of strands and nodules that are extremely sensitive to pressure. As etiologic factors, Trumpp mentions trauma, changed statics, prolonged immobilization (especially after fractures and luxations), influences of the weather, and metabolic disturbances, particularly excess of uric acid and the changed viscosity of the blood resulting from it. The process in the muscle is reversible, since a metabolic exchange can be effected. The therapeutic measures that were formerly employed for muscular pains usually were those which effected hyperemia. Deutsch was the first to apply the vasodilator histamine. However, because injection into the skin and into the muscular nodules often caused shock, he applied it by means of iontophoresis. While the patient holds the negative electrode in his hand, the histamine is applied to the painful areas with the positive electrode. The current strength is from 4 to 9 milliamperes, and the duration of application is forty-five seconds. After from two to five minutes the skin appears red and wheals are formed. But these manifestations and the burning sensation, which the patient feels in the beginning, soon disappear again. The author obtained the same good results that Deutsch did. In some instances the pains disappeared after the first treatment and movement was again possible, but in the majority of cases the pains disappeared only temporarily and after from three to twelve hours were felt again but were less severe. In the latter cases the application of histamine by means of iontophoresis was repeated several times, occasionally from ten to fifteen times, and many cases that had been refractory to several other treatments finally yielded. A tabular report indicates that of the 100 patients whom the author treated in this manner 38 were cured, 43 were greatly improved, 17 were slightly improved, and in two instances the method failed. However, it is pointed out that in some instances the indurations persisted after the pains had disappeared. As to the permanence of the results the author is unable to make definite statements since his observations extend over only a short period, but he found that patients who were given gymnastic after-treatments were resistant to relapse. He thinks that this is due to the fact that histamine facilitates the elimination of the waste products.

Zeitschrift für Kinderheilkunde, Berlin

51: 435-666 (Oct. 3) 1931

Studies on Ossification of Bones of Hand. E. Stettner.—p. 435.
*Id.: Pseudo-Epiphyses of Bones of Hand. E. Stettner.—p. 459.
Relations Between Sugar Content of Blood and of Cerebrospinal Fluid. Elizabeth Hoenig.—p. 473.
Changes in Acid-Base Economy of Organism in Diphtheria and Scarlet Fever. E. E. Martinson, A. A. Markowa, N. A. Počinkowa and S. S. Salaskina.—p. 483.
Epilepsy in Children. M. G. Petermann.—p. 506.
*Teratoma of Ovary as Cause of Pubertas Praecox. H. Fasold.—p. 519.
Creatine Metabolism in Pubertas Praecox. H. Fasold.—p. 527.
*Acid-Base Economy: Influence of Large Doses of Racemic Lactic Acid on Tetany of Nurslings. H. Fasold.—p. 535.
*Aspects of Sodium Chloride Acidosis in Nurslings. H. Fasold.—p. 541.
Nature of Scarlet Fever Exanthem and Mechanism of Blanching Phenomenon. F. von Bormann and A. Wolff-Eisner.—p. 550.
Blanching Phenomenon in Scarlet Fever. F. von Bormann and A. Wolff-Eisner.—p. 560.
Purpura Hemorrhagica with Allergic Reaction to Maternal Blood of Same Blood Group. H. N. Brinnitzer.—p. 566.
Clinical and Anatomic Aspects of Congenital Motor Defects in Region Supplied by Cerebral Nerves. H. Spatz and O. Ullrich.—p. 579.
Results of Experimental Investigations on Scarlet Fever Problem. T. Toyoda, J. Moriwaki, Y. Futagi and C. Kuroi.—p. 598.
Sexual Development. Charlotte Bühler.—p. 612.
Erythrocyte Sedimentation Reaction as Means for Early Diagnosis of Whooping Cough. H. Helmchen.—p. 643.
Hormonal Therapy of Premature Infants. E. Edelstein.—p. 646.
Milk from Cows Fed with Ensilage of Equal Value with Selected Milk. E. Edelstein.—p. 650.
Observations During Intraspinal Tuberculin Therapy of Basilar Meningitis. A. Hochwald and O. Saxl.—p. 656.
Hematuria and Appendicitis. S. Wolff.—p. 662.

Pseudo-Epiphyses of Bones of Hand.—In defining the term pseudo-epiphysis, Stettner says that it is a morphologic term which indicates that, as the result of abnormal ossification processes, epiphyseal centers of ossification develop on those portions of the bones on which, ordinarily, epiphyses do not develop. To a certain extent the pseudo-epiphyses resemble processes that occur during the embryonal period, for they appear on those parts of the bones which originally have a center of ossification anlage on both ends of the diaphysis but which later permit development only on one end. In the course of several years the author studied 2,700 roentgenograms of the hands of 1,843 children for the presence of pseudo-epiphyses. He observed that pseudo-epiphyses occur in children past the nursling age and up to the age of puberty. The cases in which pseudo-epiphyses occur outside these age limits are exceptions. In the different year groups the incidence of pseudo-epiphyses varies, but the material examined was not sufficient to determine the frequency in the various age groups in definite percentages. But the author thinks that, in apparently normal children beyond the age of 1 year and 6 months, pseudo-epiphyses of the bones of the hand may be expected in about one third of the cases. In children with developmental disturbances, however, in those with congenital cerebral disorders, enuresis, disturbances in the growth of the bones, malformations, malignant tumors, diseases of the blood, incretory disorders, and especially in diseases of the hypophysis, pseudo-epiphyses may be expected in two thirds of the cases. From this observation it may be assumed that pseudo-epiphyses have a certain diagnostic significance in that their presence indicates in later life that during the intra-uterine period developmental disturbances existed. In children with constitutional hypersensitiveness and with acquired cerebral disorders, the incidence of pseudo-epiphyses is not greater than the average.

Teratoma of Ovary as Cause of Pubertas Praecox.—Fasold reports the clinical history of a girl, aged 8, with pubertas praecox. The cause of this condition was a teratoblastoma with metastases resembling chorio-epithelioma. The pregnancy reaction according to Aschheim-Zondek was positive. It is pointed out that the chorio-epithelioma-like tissues caused an overproduction of the hormone of the anterior lobe of the hypophysis, and that this resulted in the premature sexual development.

Influence of Large Doses of Racemic Lactic Acid on Tetany of Nurslings.—Fasold gave large doses of lactic acid to a nursling with tetany. He found that the lactic acid is completely oxidized and an acidosis is produced, which becomes manifest by increased elimination of phosphoric acid and of ammonia. During the experiments the mechanical irritability of the nerves was reduced. The administration of the lactic acid effects also a greatly increased elimination of chlorine, which is probably due to the disappearance of the edema. The addition of lactic acid to milk decreases the buffer capacity of the milk. Thus the stimulation of the hydrochloric acid secretion of the stomach is considerably lessened and the intermediate alkalosis is likewise reduced. This is of importance for the alkalosis in tetany.

Aspects of Sodium Chloride Acidosis in Nurslings.—The acidotic action of sodium chloride was tested by Fasold on two healthy nurslings when the metabolism was normal and when acidity existed. When the metabolic condition is normal, the sodium chloride acidosis takes an entirely different course than it does if acidity exists. In the first case a marked alkalinuria sets in. The elimination of organic acids is reduced, but the elimination of ammonia is considerably increased. The sodium chloride acidosis has two phases: the compensatory

alkali elimination and the restitutional ammonia elimination. The urine shows the aspects of a pseudo-alkalosis. However, when acidity exists there is almost no influence on the acid-base equilibrium. The phosphoric acid in the urine is only slightly increased. Only the increased elimination of ammonia indicates an acidotic action. As explanation for this unusual behavior the hypothesis is cited that alkali was mobilized in the tissues for intermediate compensation. These observations indicate that sodium chloride has an acidotic action, and consequently the usual infusions with sodium chloride solution or with Ringer's solution are not advisable in cases of intoxication or exsiccosis, because they increase the already existing acidosis; solutions containing sodium bicarbonate should be given instead.

Zentralblatt für Chirurgie, Leipzig

58: 2673-2736 (Oct. 24) 1931

*Enterococcal Peritonitis. R. Bertram and C. Böhne.—p. 2674.
Peptic Ulcer of Jejunum Following Simultaneously Performed Cholecystogastrotomy and Gastro-Enterostomy on Account of Chronic Pancreatitis. P. Walzel.—p. 2679.
Death Following Operation for Exophthalmic Goiter in Spite of Preparation with Compound Solution of Iodine. B. Breitner.—p. 2683.
Critical Remarks on Nitrous Oxide-Oxygen Anesthesia by Means of Stiefenhofer's Apparatus. G. Eichelter.—p. 2687.
*Giant Cell Tumors of Bones. W. J. Korchow.—p. 2694.
Extract from Posterior Lobe of Hypophysis Effective Against Intestinal Atony. H. Kohler.—p. 2702.
Forceps Specially Equipped for Counter Incision. M. Friedemann.—p. 2704.

Enterococcal Peritonitis.—In the introduction, Bertram and Böhne discuss the morphologic and cultural characteristics of enterococci and also state in what organs of the body enterococci are usually found. The problem of the pathogenicity of the microorganisms is not yet definitely solved, and the pure cultures of enterococci can decide this question only in cases of acute infectious processes, which in the course of the disease and also during the postmortem examination have been under bacteriologic control. Thus far, cases of this type have not been reported. However, the authors observed two cases of enterococcal peritonitis with fatal outcome. One case occurred in a woman, aged 64, and the other in a girl, aged 7. In both instances a diffuse enterococcal peritonitis developed following a severe enteritis, which was limited to the jejunum. From numerous investigations it is known, particularly of nurslings and small children, that during acute enteritis, enterococci are to be found in the upper portions of the intestine in almost pure culture. For this reason the author considers these two cases as instances of a traversing peritonitis. Both cases demonstrate that typical enterococci may have such a degree of pathogenicity that they may cause death. However, animal experiments made with enterococci from these patients revealed no extraordinary pathogenicity. The authors further discuss whether the peritonitis caused by enterococcal infection presents special diagnostic difficulties. In both cases the anamnesis indicated noncharacteristic abdominal symptoms. For several weeks there had been lack of appetite, and diarrhea. During the last few days the general condition became worse and the signs of a diffuse peritonitis appeared. During the peritonitic stage of the disease, differential diagnostic considerations are unnecessary, since laparotomy will have to be done in any case. The authors consider conservative therapy as inadvisable in any form of diffuse peritonitis but recommend laparotomy with irrigation of the abdominal cavity and drainage of Douglas's pouch. The irrigation may eventually have to be repeated, and the disinfection of the intestinal mucous membrane is not to be neglected.

Giant Cell Tumors of Bones.—Korchow made clinical and histologic studies on the patients with giant cell tumors of bones who received treatment in the state institute for roentgenology, radiology and cancer research in Leningrad. On the basis of his observations he reaches the following conclusions: 1. The giant cell tumor represents during its initial stage a fibrous osteodystrophic process. Under favorable conditions, retrogression of this process and cure of the bone is possible. 2. In many cases the giant cell tumor, which at first takes the course of an osteodystrophic process, may develop into a true tumor and even become malignant with infiltrating growth into the adjoining tissues or with metastases into the internal organs. 3. The opinion that the giant cell tumor is an entirely benign process cannot be upheld. 4. Trauma plays the dominating part in the etiology of giant cell tumors. 5. The histologic examination (biopsy) is of greatest significance for both prognosis and therapy. 6. The surgical measures that are employed in the treatment of giant cell tumors should be conservative (scraping, resection). 7. Irradiation therapy does not always have curative effects, but it is indicated in those cases in which surgical intervention is difficult because of topographic anatomic conditions (bones of the spinal column and of the pelvis).

Zentralblatt für Gynäkologie, Leipzig

55: 3169-3232 (Oct. 31) 1931. Partial Index

*Chemical Test for Incompleteness of Placenta. J. Rübner.—p. 3171.
Spinal Anesthesia. E. Vogt.—p. 3173.
Use of Carbon Dioxide in Spinal Anesthesia. M. Matoušek.—p. 3178.
Method of Irradiation of Cancers of Female Genitalia. A. Pickhan.—p. 3180.
*Spasm of Mammilla and Similar Disturbances. M. Rodecurt.—p. 3184.
Indications for and Technic of Vaginal Operations. G. Siefart.—p. 3190.

Chemical Test for Incompleteness of Placenta.—Rübner, after evaluating the various tests for determining the incompleteness of the placenta, thinks that inspection is the most reliable and the simplest method. However, the results of the inspection can be made more reliable by applying certain chemicals to the surface of the placenta, which make the differences in color between the complete and the incomplete portion more noticeable. The author found that a 20 to 50 per cent solution of sulphosalicylic acid was suitable for such a reaction. After the blood clots have been rinsed away from the surface of the placenta, the area at which the placenta seems incomplete is covered with the acid solution. From one-half to one minute later, the reagent is dabbed off by means of cotton, after which the normal surface shows a bluish white, mother of pearl iridescence, whereas the incomplete portion shows a yellowish gray, claylike color with small dark spots. The difference between the normal and the incomplete portion is still more emphasized in that the normal portion is smooth, whereas the incomplete portion is rough. Similar differences between the normal and the incomplete surface can be demonstrated also by injecting the reagent into the tissues.

Spasm of Mammilla and Similar Disturbances.—Rodecurt reviews the literature on spasm of the mammilla and then describes five cases of his own observation. They were not all of the same type, in that some seemed to be connected with exposure to cold, whereas in others this was not the case. In some of the patients the menstrual flow was slight, but observation did not corroborate the assumed relation between this and the spasm. However, the case histories given by the author mention nervousness of the patients. In regard to the treatment he states that he obtained favorable results with atropine ointment, with embrocations with tincture of belladonna and with oral administration of quinine and atropine.

Vrachebnaya Gazeta, Leningrad

Oct. 31, 1931, number 20, pp. 1477-1554

Factors in Study of Neuroses. A. A. Perlman.—p. 1479.
*Temporal Reflex. S. S. Vermel.—p. 1487.
*Abdominal Syndrome in Epidemic Encephalitis. I. M. Lipetz and V. N. Batkevich.—p. 1491.
Colloidal Silver in Treatment of Acute Articular Rheumatism. I. I. Mnatzakanov.—p. 1496.
*Dextrose and Insulin in Treatment of Kidney Diseases. M. G. Bogdatyan and M. I. Ribina.—p. 1500.
Rectal Therapy in Cardiac Disturbances. M. Rapoport.—p. 1504.
Specific Therapy in Epidemic Cerebrospinal Meningitis. M. A. Rechnik.—p. 1506.
Dietetics in Typhoid of Children. N. Z. Umikov.—p. 1508.
Intracranial Factors in Peritonsillar Abscess. M. I. Elyason.—p. 1510.
*Foreign Bodies in Uterus. A. M. Agaronov.—p. 1513.

Temporal Reflex.—Vermel reports that in certain pains of the head when two fingers are placed on the temporal artery, a strong pulsation is felt. This he calls the temporal reflex. The reflex is more evident on the right side. During the reflex the temporal artery elongates and reveals branches heretofore not evident to the eye. This is especially clear in arteriosclerosis. The underlying conditions probably have a sympathetic origin. The irritation of the trigeminal nerve travels over the ganglion, reaches the vasomotor sympathetic nerves and causes vasodilatation of its branches; the superficial temporal artery is in turn dilated and discloses its hitherto unnoticed branches. This dilatation takes place only in pathologic con-

ditions, such as vagosympathicotonia in neurotic persons (neurasthenia), and in changes of the vasomotor system, in arteriosclerosis in both young and old, and in especially acute migraine. The author agrees with Pasteur Vallery-Radot that migraine cannot take place without angiospasm; however, vasoconstriction is always followed by vasodilatation, and the latter is demonstrated by the temporal reflex. He also agrees with Hahn that migraine takes place in three phases; namely, angiospasm, angiodilatation, and transudation and exudation. The last two phases cause increased intracranial pressure and headache. Therefore it is the author's belief that the visual appearance of the heretofore invisible branches of the superficial temporal artery in migraine is a result not of vasoconstriction but of vasodilatation. The author has often noticed this temporal reflex in migraine and other head pains, usually on the side of the head on which the pain occurs.

Abdominal Syndrome in Epidemic Encephalitis.—Lipetz and Batkevich assert that they can add to the various known extra-abdominal dystrophies (such as pleurisy, central pneumonia, cancer of the breast, pericarditis, broncho-adenitis and tabes), that are complicated by an abdominal syndrome, the less known disease of epidemic encephalitis. Five case histories are discussed and the following conclusions drawn: There often appears in the course of epidemic encephalitis an abdominal complication with such symptoms as pain, obstruction and muscular tension, all together included in an abdominal syndrome, often dominating and sometimes appearing alone in the clinical picture. To diagnose this syndrome accurately, a careful physical examination of the abdomen should be undertaken in addition to the general physical examination. The authors stress the importance of the recognition of this syndrome.

Dextrose and Insulin in Treatment of Kidney Diseases.—Bogdatyan and Ribina picked twenty-five patients for special study, seven of whom received dextrose plus insulin, one insulin only, and seventeen dextrose only. Nineteen were acute forms (ten nephritis and nine nephrosonephritis) and six chronic forms (four nephrosonephritis and two nephritis). Since small doses of insulin did not make any difference, dextrose was later used entirely. Twelve, or 48 per cent of the patients, were cured completely; nine, or 36 per cent, were improved, and four, or 16 per cent, did not show any change. The authors' studies permit them to say that dextrose injections seem to be a good means of treatment of kidney disturbances. From 15 to 20 cc. of a 50 per cent solution of dextrose is slowly injected intravenously at daily intervals. Concentrated solutions act as diuretics, are antitoxic, and improve metabolism and kidney function. Under the influence of dextrose, the albuminuria and especially the hematuria decreases, and the diuresis increases. The improved kidney function and metabolism lead to decreased acidosis with decreased organic acids as the kidney increases its acid excretion and decreases its nitrogen retention. In all cases the period of hospitalization as compared with other forms of treatment is markedly lessened. Insulin assists the tissue retention of water and therefore is not suitable for treatment, especially for the treatment of edema. Intravenous injections of concentrated solutions of dextrose did not cause complications.

Foreign Bodies in Uterus.—Agaronov describes five instances in which efforts to produce abortion without medical assistance resulted in accidents in which the mechanical agents were left in the uterus. The author recommends sex education of the masses, popularization of contraceptive measures, and the establishment of clinics where abortions may be made possible for financially embarrassed individuals.

Nederlandsch Tijdschrift voor Geneeskunde, Haarlem

75: 5571-5678 (Nov. 14) 1931

Preventive Otology. P. H. G. van Gilse.—p. 5572.
*Two Hundred Myoma Operations. J. A. van Dongen.—p. 5579.
*Etiology of Multiple Sclerosis. A. H. W. Boele and M. van Eckelen. —p. 5590.
Cerebral Embolism Post Partum: Case. A. J. M. Duyzings.—p. 5594.
Spontaneous Elimination of a Subserous Fibromyoma. E. A. Immink. —p. 5599.

Two Hundred Myoma Operations.—Van Dongen regards the roentgen treatment of fibromyoma uteri as a method that is irrational in principle, since it interrupts the functioning of the ovaries, has many contraindications, does not show a lower mortality than surgical intervention, and fails in some cases, leaving the diseased organ in the body, with all the evil consequences. He does not share the opinion of van Rooy and others that roentgen therapy has gained a firm foothold and that the opposition to the method has disappeared. The author admits that roentgen treatment has many friends, but in the literature he sees signs indicating that its defenders are beginning to weaken. He is convinced that, twenty-five years from now, the medical world will have recovered from the error of using the otherwise valuable discovery of Roentgen for the treatment of fibromyoma uteri.

Etiology of Multiple Sclerosis.—Boele and van Eekelen conclude from their researches that the bodies found in the spinal fluid of persons with multiple sclerosis and described as bacteria by Chevassut are not specific but probably arose as the result of physicochemical processes in the culture medium, since they are found also in the control tests. The authors were unable to discover the changes in the acidity of the cultures, described as typical. In fact, instead of a decline they always found an increase of the hydrogen ion concentration. Hence, in view of these conclusions, it is impossible to prepare an autovaccine. Treatment with nonspecific proteins injected with the patient's own spinal fluid did not give distinct results in connection with general dietetic therapy.

Ugeskrift for Læger, Copenhagen

93: 1051-1070 (Oct. 22) 1931

*Clinical Aspect of Rheumatic Infection. E. Warburg.—p. 1051.

Clinical Aspect of Rheumatic Infection.—In his review Warburg pays particular attention to the early stages of rheumatic heart disease. He sees in the improvement of general hygiene the best hope for decreasing rheumatic infections.

93: 1071-1092 (Oct. 29) 1931

*Primary Infection in Pulmonary Tuberculosis in Adults. H. Heckscher. —p. 1071.
Cases of Fetishism. V. Bækgaard.—p. 1080.

Primary Infection in Pulmonary Tuberculosis in Adults.—Heckscher says that his investigations on the frequency of tuberculosis in the young men in military training in Denmark from 1894 to 1931 fail to show that military service has a provocative influence on tuberculosis, and that similar observations were made by Meulengracht and Würtzen in a study of the work of the nurse and tuberculosis. The morbidity in men in their twenties appears to have decreased less than the mortality, and according to Faber and Ostenfeld the mortality has decreased less for this age group than for all other age groups. These two phenomena Heckscher associates with the increase in late primary infections, due to the decrease of infection in childhood, which is also the most important cause of the lowered tuberculosis mortality in all age groups. Among soldiers and nurses in Denmark the transition from negative to positive tuberculin reaction seldom gives signs of disease. The frequency of known sources of infection for tuberculosis is in the main the same throughout the country. Familial infection occurs in about 80 per cent of the cases in children and is demonstrable in at least half of the adult patients, whether in their twenties or in the fifties. Pulmonary tuberculosis in older patients in Denmark, he says, is diagnosed far too seldom, and every effort should be made to recognize and isolate infective cases of tuberculosis when children are present. Whatever contributes to the reduction of tuberculosis among children will be the best means of combating tuberculosis among adults.

93: 1093-1120 (Nov. 5) 1931

*Pancreatogenic Steatorrhea: Case. A. Brems.—p. 1098.
Purified and Concentrated Serum Against Diphtheria and Significance in Treatment of Diphtheria. J. R. Mørch.—p. 1100.

Pancreatogenic Steatorrhea: Case.—In Brems's patient, previously well, pancreatogenic steatorrhea appeared, accompanied by marked but transient symptoms of a disturbance in the islands of Langerhans; namely, increased fasting, blood sugar values, glycosuria, and diabetic blood sugar curve after the oral administration of dextrose. There was thrombopenia but not osteoporosis. The case is regarded as a pancreatitis with temporary diffuse injury of the insulin-producing islands, possibly due to canalicular propagation of an infectious intestinal disorder.